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DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, SECRETARY
BUREAU OF MINES
VAN. H. MANNING, DIRECTOR

REPORT OF A JOINT COMMITTEE APPOINTED FROM THE BUREAU OF MINES AND THE UNITED STATES GEOLOGICAL SURVEY BY THE SECRETARY OF THE INTERIOR TO STUDY THE GOLD SITUATION

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CONTENTS.

Page.

Summary 7

Introduction 11

Gold production 11

- Relation of gold to other industries 11
- Gold output of the world 18
- Distribution of gold production 19
- Decline in gold production 20

Gold standard and need of gold 23

- Gold as the standard of value 23
- Bank reserves and national credits 25
  - Expansion of credits 25
  - Ratio of gold reserves to liabilities 27
- Relation of credits to gold reserves 30
  - Trade balances 31

Production, exports, imports, and consumption 33

- Hoarded gold 34
- Gold stock in United States 34
- Imports and exports of gold and silver in principal countries 34

Source of gold in the United States 36

- Mine production by States 37
  - Production in 1917 as compared with 1916 39
    - Arizona 40
    - Idaho 41
    - Montana 41
    - Nevada 41
    - Utah 42
    - Washington 42
    - Oregon 42
    - Colorado 43
    - South Dakota 43
    - Alaska 43
    - California 44

The cost of producing gold 44

- Profits and costs of mining 48
- Increased cost of mining 49
  - Increased cost of supplies 49
  - Dredging 55
  - Comparative costs at porphyry copper mines 56
  - Costs in South Africa 57

The labor situation 57

- Shortage of labor 57
- Lower efficiency of labor available 58
- Number of men employed in gold mining 59

The labor situation—Continued. Page.
- Wages at gold mines as compared with other mines 60
- Labor conditions abroad 63
- Conditions in Canada 63
- Experiment in the Rand 64
- Suggested methods of relieving labor shortage at mines in United States 64

Methods of increasing the gold reserve 65

Relief asked for the gold-mining industry 67
- Resolutions of conference at Reno, Nev. 67
- Relief measures proposed by gold-mining industry in responses to questionnaire 68
- Discussion of proposed relief measures 68
  - Bonus 69
  - Exemption from military service 71
  - Assistance of United States Employment Service 71
  - Furnishing supplies at special rates to gold miners 72
  - Abolishment of taxes 72
  - Preferred classification for freight 73
  - Débris Commission (California) 73
  - Preferred classification for electric power 73
  - Free export and sale of gold 73
  - Further suggestions by committee 74

Conclusion 75

Index 81

ILLUSTRATIONS.

Page.
PLATE I. Diagram showing relative magnitude of variations in production, consumption, imports, exports, and domestic stock of gold 34
FIGURE 1. Diagram showing world's outputs of gold and other mineral products, with prices for coal, iron, and petroleum for past 40 years 13
2. Diagram showing outputs, prices, and other data for gold and other minerals in the United States 14
3. Diagram showing fluctuations in prices during the war 17

TABLES.

TABLE 1. Estimated total production of gold, 1493–1917 18
2. Chief gold-producing countries, with date of initial production and output to 1917 19
3. World's production of gold by countries, 1912–1917 21
4. The Witwatersrand gold-mining industry's progress 22
5. National wealth and present indebtedness of principal countries 26
6. Approximate stock of gold in banks, public treasuries, and in circulation in principal countries of the world 27
7. Comparative statement showing principal assets and liabilities of the leading central banks of issue at dates specified 28
8. Relations of money in circulation to foreign trade 31
9. Gold production and consumption 33
ing June and the 12 months ending June, 1917, and 1918 35
10. Total imports and exports of gold and silver, by countries, during June and the 12 months ending June, 1917 and 1918 35
11. Mine production of gold in the United States in ounces 38
12. Approximate distribution of gold production of the United States in 1916 and 1917, and number of producing mines 39
13. Gold-mining statistics for 1917 compiled from questionnaire sent to largest producers 46
14. Comparative statement of details of operation at most important gold mines in United States 46
15. Costs of mining supplies and labor at Ready Bullion mine in Alaska 52
16. Comparative statement showing prices of mining supplies in California, August, 1914, and July 31, 1918 54
17. Variation in cost of Tonopah mine and mill supplies 54
18. Comparative statement showing increased cost of most important items used in operating gold dredges 55
19. Data showing increased dredging cost in cents per cubic yard 56
20. Approximate number of men employed in mines producing gold in the most important gold-producing States 59
21. Comparative wage scale for different kinds of mines 61
22. Estimated stock of money in the United States, September 1, 1918 66

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SUMMARY.

The findings of the committee appointed in July, 1918, by the Secretary of the Interior to investigate the gold mining situation in the United States, consisting of Hennen Jennings, chairman; J. H. Mackenzie and Charles Janin, of the Bureau of Mines; and H. D. McCaskey and F. L. Ransome, of the United States Geological Survey, are set forth in the accompanying report.

The status of the industry and the conclusions and recommendations of the committee, as presented therein, may be briefly summarized as follows:

Statistics of production dating from the discovery of America in 1492 show that the annual average output was small until 1850, when the discovery of gold in California and Australia marked the beginning of great gold output. The figures show a slight decline from 1855 to the opening of the mines in the Transvaal in 1887; then there was a very large increase in the yearly output until 1910, since which date there have been irregular fluctuations until 1915, when a serious decline took place.

Though the increase in the output of gold has been rapid during the past 25 years, it has not kept pace with the output of coal, iron, copper or petroleum, or with the rapid growth of bank deposits.

The present decrease in gold production demands serious consideration, as the maintenance of a sufficient gold reserve is essential to the security of our national finance and credit. The United States is at present the most favored nation in regard to gold reserves, holding over $3,000,000,000, or more than one-third of the gold stock of the world, but it has contracted debts on a gold basis many times that existing before the war.

The principal causes of the decline in gold mining in this country are the shortage of labor and higher wages due to the war, the lower efficiency of available labor, the great increase in the cost of supplies, and the higher cost of power. In addition, the depletion of certain deposits and the lower grade of ore mined in others have contributed to reduction of output.

Bankers and political economists nearly all agree that the gold standard should be maintained in principle.

The war has changed the United States from a debtor nation into a great creditor nation.

Since the outbreak of the war, prices of all commodities have increased greatly except that of gold, which as the standard of value is fixed at $20.67 per ounce. Thus the purchasing power of gold has diminished as the prices of other commodities have risen.

The great increase in the cost of gold mining has discouraged new enterprises and curtailed existing operations. Many mines have been compelled to close and await more favorable conditions. Those mines that have continued operations have been able to do so only by practicing the most rigid economies and by the curtailment of development work. The average operating cost of producing a dollar's worth of gold at the large and most favored quartz mines in 1917 was 70 cents as compared with 57 cents for 1915. Gold mining under present conditions offers little inducement to capital.

Various means of stimulating the production of gold in the United States have been proposed. The committee reports on them as follows:

Payment by the Government of a bonus on newly mined gold has many advocates. The committee does not believe that the granting of a bonus would be beneficial at this time.

The United States Employment Service can, if properly authorized, be of great help in diverting labor to the gold industry. Gold mining has been officially declared an essential industry, and in the opinion of the majority of the committee should rank in this respect with other preferred industries. Exemption from draft and deferred classification of gold labor has already been granted to a certain extent by the War Department.

The furnishing of supplies to gold mines at prewar or cut prices does not seem to be feasible.

The elimination of the excess-profits tax on gold mining, and the encouragement of a maximum output thereby might result in larger revenues than with the tax standing, as larger dividends paid to share holders would mean greater revenue for general taxation. As the profits of a gold mine, no matter how large, can not be ascribed to war conditions, but on the contrary are diminished by them, the remission of this tax is just and logical.

Gold mining as an essential industry is entitled to preferred classification for railroad freight, etc., and should receive the benefit of any modification of freight rates granted any other preferred industry.

When electric power is used gold mines should have a high-class rating with regard to power consumption, and power should be curtailed only when necessary.

The privilege of free export and of sale to manufacturers would stimulate production, and might also be a safeguard against inflation. The committee recommends the removal of restrictions on the export and sale of gold.

The committee suggests that gold and other mining companies might properly be required by law to furnish to the Government, with such frequency as may be desirable, statistics of their costs, production, and profits, and these should be available for publication.

The Government should, through the Bureau of Mines, assist in improving methods of mining and metallurgy of gold ores, particularly in the treatment of complex and low-grade ores. A wide field of work is presented here.

Some aid in reducing costs might be obtained by cooperative buying of supplies by mining companies through central agencies in each State or district, but the organization of a general system of cooperative buying would be very difficult.

Possible methods of maintaining the visible gold reserve, apart from mine production, are: (1) The curtailment of the use of gold for manufactures, and (2) making a call on the public to turn in hoarded gold. In France voluntary contributions by the populace since the war began have amounted to more than 2,000,000,000 francs.

Further relief might be obtained by amending the war-minerals bill to include gold and voting an appropriation to be used in directing the search for new deposits.

REPORT OF A JOINT COMMITTEE APPOINTED FROM THE BUREAU OF MINES AND THE UNITED STATES GEOLOGICAL SURVEY BY THE SECRETARY OF THE INTERIOR TO STUDY THE GOLD SITUATION.

INTRODUCTION.

In July, 1918, the attention of the Secretary of the Interior was called to the rapidly increasing cost of producing gold and the declining output of that metal in the United States. Realizing the importance of the gold-mining industry, the Secretary appointed a committee, consisting of Hennen Jennings, chairman, J. H. Mackenzie, and Charles Janin, of the Bureau of Mines, and H. D. McCaskey and F. L. Ransome, of the United States Geological Survey, to make a thorough study of the gold-mining situation in the United States. The study was to cover the increased cost of recovery and the decreased output of gold, and to consider the different measures that had been proposed to relieve the industry and stimulate production. This report embodies the results of the investigation and study made by the committee.

The report presents statistical data compiled from various sources, showing the production of gold in the United States and other countries, with comparative figures for coal, iron, and other mineral products, and describes the sources and distribution of gold output in the United States. It discusses the relation of gold production to finance and credit, the causes for the decline in gold output, and measures for the relief of the industry.

The Interior Department publishes this report in the belief that the widest publicity possible should be given the findings of the committee in order that attention may be directed to the serious conditions revealed therein, and in the hope that wide discussion of the subject may result in some action being taken that will aid in upholding the gold standard and the gold industry.

GOLD PRODUCTION.

RELATION OF GOLD TO OTHER INDUSTRIES.

Before the specific problems that confront the gold miner in the United States are considered, it seems desirable to present some facts and statistics that bear on the general situation in order to bring out the relation between the mining of gold and the mining of other mineral products, the relation between mining and other industries, and especially the function of gold, as a standard of value, in bringing all industries together.

Diagram 1 (fig. 1) and diagram 2 (fig. 2) herewith are deemed illustrative in this connection. Diagram 1, for the world, portrays the relative outputs of gold, iron, coal, copper, and petroleum, and gives the ruling prices in London of coal, iron, and copper for the past 40 years. This diagram demonstrates the moderness of large-scale mining and indicates the sympathetic growth of these mining industries, which in some periods show marked parallelism. The fluctuations in prices since 1873 are shown, as also the comparative stability in the prices of coal and iron from 1880 to the beginning of the great war. As the diagram shows, mining of all kinds of minerals, considered in the light of present-day outputs, was in its infancy from 1800 to 1870; petroleum first became a vital factor in the latter year.

The aggregate of the output of these minerals for the past 25 years is probably greater than that in all previous time. It is observable that gold mining, starting on a large scale in 1850 with the discovery of gold in California and Australia, was the pioneer in big mining, and that from 1890 to 1912 the output curve for gold is nearly parallel to those for iron, copper, and petroleum, and in close accord with that for coal. Compared with the minerals production of 1870, it will be found that the yearly output of petroleum has increased nearly 75-fold, copper 14-fold, iron 7-fold, coal about 6-fold, and gold only 3.3-fold. Thus gold has not kept pace with the other great mineral products that are the basis for the manufacture and distribution of force in modern civilization and are the fundamental causes of the great wealth of modern times. On the other hand, gold is not largely consumed but accumulates as time goes on.

Diagram 2, for the United States during the same period, gives the outputs of gold and other mineral products as shown on diagram 1, and in addition indicates the growth of the population of this country, the railway mileage, deposits in all reporting banks, and the number of miners engaged in all classes of mining. The prices of coal, iron, copper, and petroleum also are given, showing the comparatively small fluctuation in the prices of coal and petroleum between 1875 and the beginning of the present war; also the high peak of prices of coal, iron, and copper at the end of the Civil War.

It is seen that in the earlier part of the nineteenth century there was no mining of consequence in the United States, and also, as is indicated by the world diagram, that mining on a large scale in this country did not start until about 1870. At that time the deposits in all reporting banks amounted to $1,092,135,921; the railway mileage 60,000 miles; the population 40,000,000; and the gold output $50,000,000. From this date, as the table shows, the yearly output of gold in the United States has increased only 2-fold, population

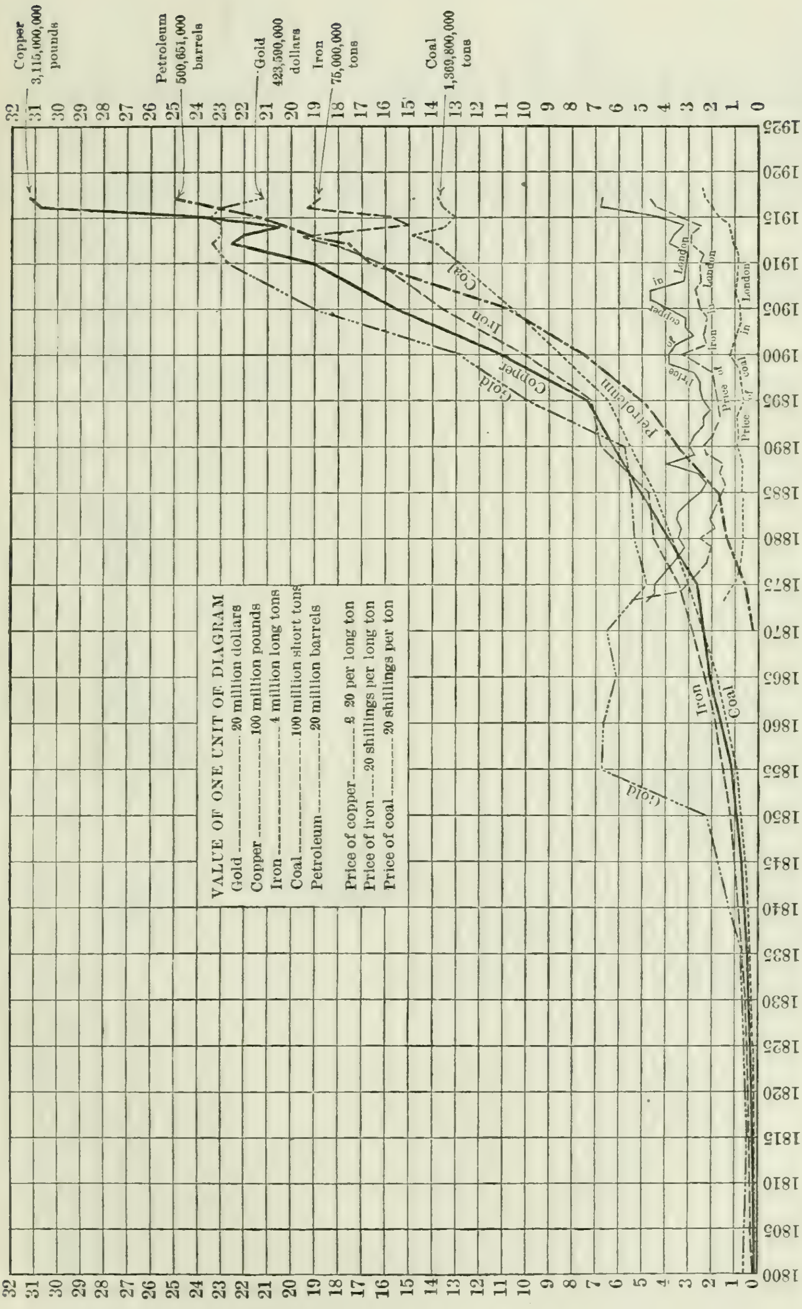

FIGURE 1.—Diagram showing world's outputs of gold and other mineral products, with prices for coal, iron, and petroleum for past 40 years.

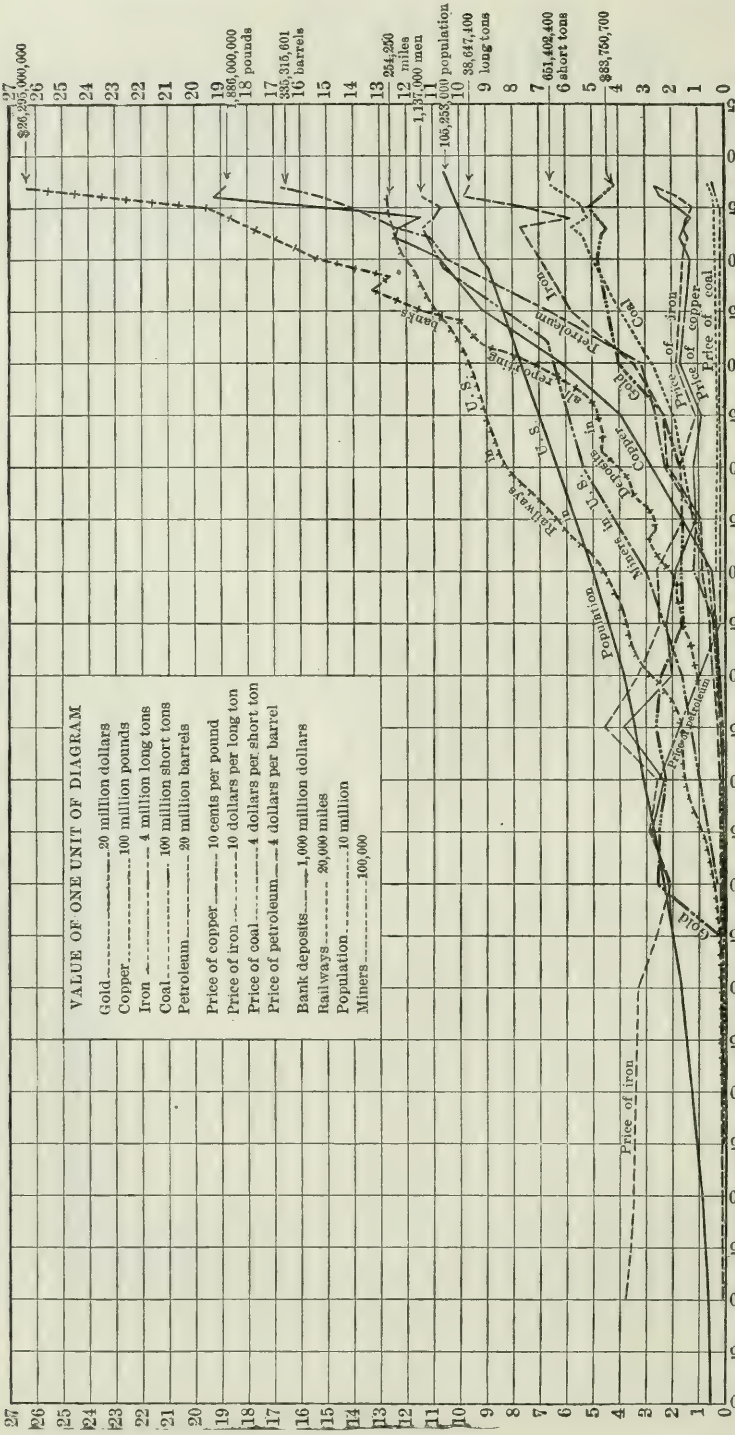

FIGURE 2.—Diagram showing outputs, prices, and other data for gold and other minerals in United States.

about 2.6-fold, petroleum about 70-fold, copper 80-fold, bank deposits 24-fold, and railway mileage about 4-fold.

As in diagram 1, it is shown that the production of minerals in this country for the past 25 years is greater than that of all previous time. Bank deposits and railway mileage have been in closer accord with the outputs of minerals than with the growth of population. The output of gold has not only failed to increase in the same ratio as that of other minerals but is now showing decline.

These diagrams stimulate interest as to the cause of such vast increases in the output of these minerals. The explanation would appear to be that mining products, through the teamwork of the scientist, inventor, capitalist, administrator, engineer, mechanic, and workers of all descriptions, have given man material and machinery with which to exert prodigious force, outclassing many fold the muscular energy of all mankind.

The part that gold has played is not apparent at first sight, but as that metal has been accepted by the workers throughout the world as a fixed and stable token of wealth, its acquirement has been an incentive to effort through all the ages in all industries and occupations. It binds together in common purpose all workers and is the most nearly universal unit of labor of which we have knowledge. Its value is not based upon the fiat of any one Government. For the accumulated gold of the past or the prospective gold of the future, nature has and will demand an equivalent of human effort in its obtainment. Thus, a gold coin represents a storage cell of human energy, having potential value on a labor basis, and in this way has been vitally instrumental in creating confidence and unity of action among the workers of different parts of the world.

The population of the United States, excluding insular possessions, has been estimated at the present time at about 105,000,000 people of both sexes and all ages. According to the census report of 1910 the population was 91,972,266. At that time the number of males engaged in gainful occupations was given as follows:

Number and percentage of male workers in the United States in 1910.

Occupation.	Number.	Per cent.
Agriculture, forestry, and animal husbandry	10, 851, 702	36. 1
Extraction of minerals	963, 730	3. 2
Manufacturing and mechanical industries	8, 837, 901	29. 4
Transportation	2, 531, 075	8. 4
Trade	3, 146, 582	10. 5
Public service (not elsewhere classified)	445, 733	1. 5
Professional services	929, 684	3. 1
Domestic and personal service	1, 241, 328	4. 1
Clerical occupations	1, 143, 829	3. 8
All occupations, total	30, 091, 564	100. 0

The table shows there were 30,091,564 men engaged in gainful pursuits, and of these 963,730, or only 3.2 per cent of the adult male workers of the country, were engaged in mining. The number of miners at work in 1917 was 1,137,000. Although the percentage of men engaged in mining is small, the amount of material produced is extremely large, as is indicated by the percentage that it constitutes of the transportation on our railroad systems, given by the Interstate Commerce Commission's report of June, 1918. According to that report, the total tonnage handled by the railroads is divided as follows:

Percentages of different products hauled by railroads.

	Eastern. *Per cent.*	Western. *Per cent.*
Mine products	58.58	44.78
Manufactured products	18.63	13.25
Agriculture	7.24	17.95
Products of forests	5.20	14.00
Miscellaneous	10.35	10.02
All products, total	100.00	100.00

The foregoing figures are more significant in connection with what follows.

Agricultural products are primary in that they sustain life, but mineral products, although secondary in this regard, are basic in that they sustain modern civilization. The Federal Government appropriations for the advancement of agricultural purposes for the year 1916 were $31,087,407. The appropriations for mining for this same year were $1,537,820.

Diagram 3 (fig. 3), by W. R. Ingalls, editor of the Engineering and Mining Journal, is a most interesting study of the fluctuations in the prices of wheat, cotton, pig iron, electrolytic copper, lead, and common spelter, during the war, coupled with the Sauerbeck Statist index numbers for Great Britain for 45 commodities, London Economist index numbers for Great Britain for 35 commodities, and Bradstreet's index numbers for the United States for 96 commodities.

In addition, diagram 3 shows the increase in the weekly earnings of employees in representative factories, and the wage increase of common labor as paid by the United States Steel Corporation. The prices of commodities charted show great fluctuation.

The variation from the highest to lowest of the index numbers are as follows:

	Variation.	Fold.
Sauerbeck	8.4 to 19+	2.26
London Economist	7.7 to 11.1	1.44
Bradstreet	8.8 to 19.2	2.26

The increase in wages from the lowest to the highest figure during this period is shown to be as follows: Common labor, United States

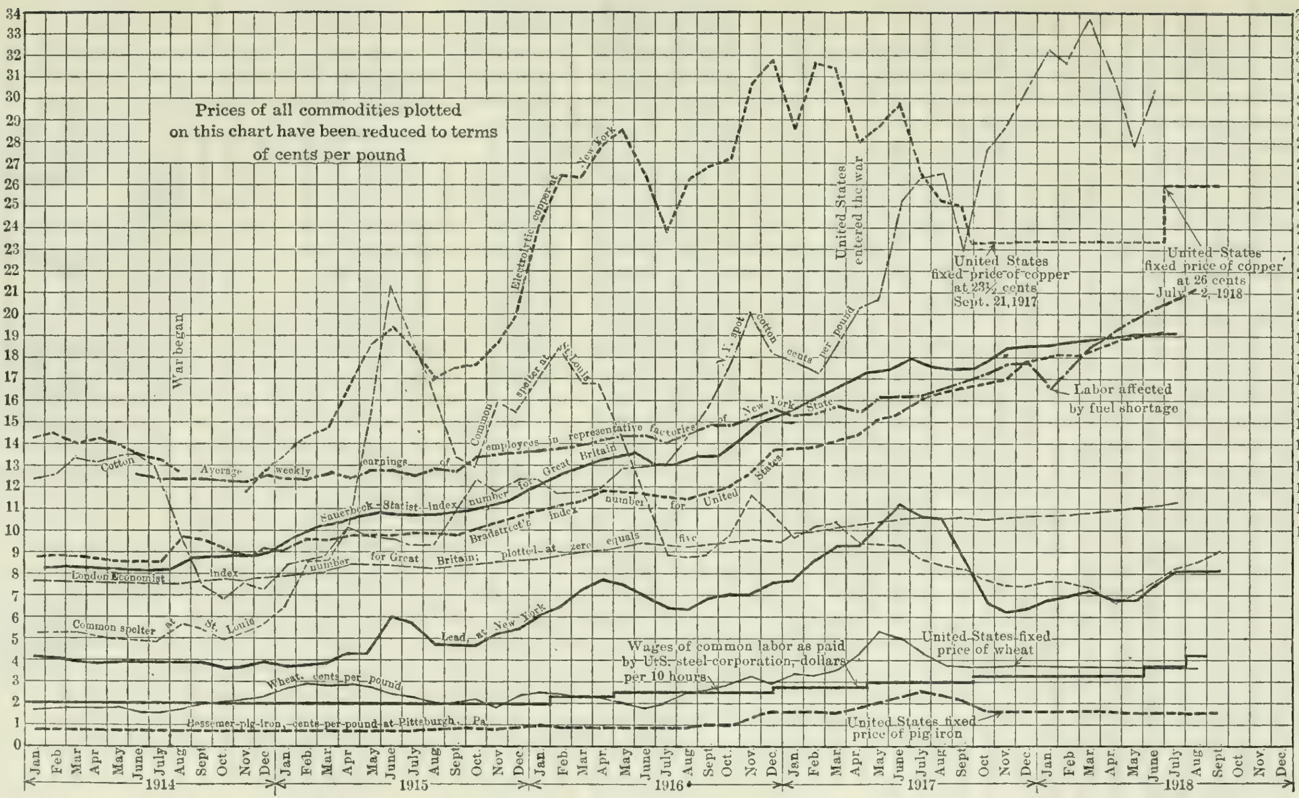

FIGURE 3.—Diagram showing fluctuations in prices during the war.

Steel Corporation, 2 to 4.2; average weekly earnings, employees of representative factories, 12.75 to 19.1.

Prices of all commodities have advanced except that of the ounce of gold, which as the standard of value has a fixed price of $20.67, a gold dollar containing 25.8 grains of standard gold (900 fine), or 23.22 grains of pure gold. Thus, in reality, the purchasing power of gold has decreased in proportion to the increase in prices of other commodities, which in one way or another are factors in the cost of obtaining new gold.

As a war necessity, export or even internal free trade in gold has been suspended. Gold mining has, therefore, been most seriously injured by the war and has thus been discriminated against by legislation for the protection and benefit of the Treasury. It is quite impossible for any excess profit to be made by gold mining during the war with the embargo on gold that now exists. The Secretary of the Treasury states his views on the desirability of keeping open the gold mines and has heartened the gold industry in a letter to Representative Sulzer of June 10, 1918:

> At no time has this country so much required the largest possible production of gold as at present. Next to food and ammunition, gold is one of the most needed war essentials. In order to place the enormous amount of Government bonds required to finance our war expenditures, a large credit structure will inevitably be erected on our gold reserves, and it is necessary that these reserves, which are the foundation of the structure, shall be maintained on the broadest possible basis. * * *
>
> The man or the community that maintains or increases its production of gold in the face of difficulties and discouragement is performing a patriotic service which deserves recognition no less than the more obvious but not less useful services that are more in the public eye.

GOLD OUTPUT OF THE WORLD.

There are no reliable estimates of gold production prior to the discovery of America, but since that date estimates have been made and statistics kept. The following table gives the total estimated production of gold from 1493 to 1917, inclusive:

TABLE 1.—*Total estimated production of gold, 1493 to 1917.*[a]

Period.	Total for period.	Years.	Annual average (in millions).
1493-1600	$501,640,000	108	4.6
1601-1700	606,315,000	100	6.0
1701-1800	1,262,805,000	100	12.6
1801-1850	787,463,000	50	15.7
1851-1890	4,806,866,000	40	120.1
1891-1900	2,101,241,000	10	210.1
1901-1910	3,780,704,000	10	378.1
1911-1917	3,173,691,000	7	453.4
	17,020,725,000	425	40.0

[a] Compiled from Report of the Director of the Mint for 1916, p. 223, and report for 1917.

Since 1894 the output has been more than the total mined in the previous 400 years; the average for this 24-year period has been approximately $375,000,000 a year.

The total available gold on hand in the world as gold reserves in 1894 has been estimated at $3,965,900,000. Table 9, page 33, gives comparison between imports and exports of gold, production and consumption in the United States, and the accumulations to the gold reserves since 1900. The quantity of gold used in the arts has increased since 1900 until during recent years it has amounted in the United States to about $40,000,000 a year.

It is estimated that there is about $9,000,000,000 in gold in the national and bank reserves of the world. Of this amount more than one-third is held by the United States Treasury and Federal Reserve banks, an increase of more than $2,000,000,000 since 1900.

DISTRIBUTION OF GOLD PRODUCTION.

Gold has been mined in every continent and in about 60 different countries. It has been found in the oldest rocks and in all subsequent geologic formations. Traces of gold exist in seawater. Evidently, gold is widely distributed but never in great quantity as compared with some other metals. The countries that have chiefly contributed to the gold production of the world, the dates of initial operations, and the estimated total amount produced to the end of 1917 are as follows:

TABLE 2.—*Chief gold producing countries, with date of initial production and output to 1917.*[a]

Date.	Country.	Output (in millions).
1792	United States	$3,913
1851	Australia	3,261
1886	Africa (Witwatersrand, 2,572; all other Africa, 691)	3,263
1745	Russia and Siberia	1,566
1537	Colombia	939
1693	Brazil	787
1521	Mexico	502
1858	Canada	412
------	China and Korea	281
1493	Austria-Hungary	216
1545	Chile and Bolivia	199
1884	British India	189
1533	Peru	128
1875	French, British, and Dutch Guiana	150
1866	Venezuela	63
	Total	$15,869

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[a] Compiled from Soetbeer; reports of the Director of the Mint; and "The World's Gold" (1908) by Louis De Launay.

The mineral outputs of modern times have been made possible only by the advance in invention, engineering, and chemistry and in business organization. Large deposits of low-grade ores have been treated at a profit through the cooperation and intelligent effort of the engineer and the business man.

DECLINE IN GOLD PRODUCTION.

The future of gold mining is problematical. The gold output of the world seems to have passed its zenith and to be on the decline. It is well recognized that any producing ore deposit is a diminishing asset and that new ore bodies, as well as improved technique in mining and metallurgy, are essential to assure continuance of output. Few new ore bodies of importance have been added to the gold and silver producers in recent years. It is unwise, however, to predict that important discoveries of new deposits will not be made.

Table 3 following gives the gold returns from all countries of the world from 1912 to 1917, inclusive, and relative percentages for the prewar year of 1913, and shows that the production of gold in all those countries has been decreasing. Further decreases may be expected from the action of natural causes, such as impoverishment and exhaustion of ore bodies, and from the constantly increasing costs of operation which make material formerly classed as "ore" now unprofitable for treatment. The relative importance of the gold production in different countries is shown by percentages for the year 1913. On a war basis the sources of production can be classified as follows: Allied nations, 91.3 per cent; central powers, 0.6 per cent: and neutral countries, 8.1 per cent. Of the allied nations, the United Kingdom, with its colonies and dependencies, produced 62.6 per cent; and the United States, 19.3 per cent. The chief producing countries of the world rank in order as follows: Transvaal, United States, Australia, Russia, Canada, and Rhodesia.

The Witwatersrand gold fields, in the Transvaal, South Africa, the most extensive and productive of all, now yield about 40 per cent of the world's gold. The mines employ 200,000 natives and 20,000 white men, a total of 220,000, or more than are employed in all the metalliferous mines in the United States. Wages and salaries for white labor have been larger on an average than in any other gold fields. Natives receive about 50 cents a day and are given food and shelter. From an examination of the following tabulated statement of Witwatersrand production it would appear that these fields have about reached their acme. This statement is the most complete record of gold-mining operation in the world. The yields,

TABLE 3.—*World's production of gold by countries, 1912 to 1917, inclusive.*

[Compiled from the reports of the Director of the Mint, U. S. Treasury Department.]

	1912	1913	Per cent.	1914	1915	1916	1917
North America:							
United States	$93,451,500	$88,884,400	19.3	$94,531,782	$101,035,700	$92,590,300	$83,750,700
Canada	12,648,800	16,598,900	3.6	15,983,004	18,977,901	19,235,000	15,200,000
Mexico	24,500,000	19,308,800	4.2	4,788,175	6,559,275	7,690,700	9,000,000
Central American States	3,030,400	2,721,700	.6	2,393,190	2,970,271	3,517,600	3,122,000
South America:							
Argentina	107,300	2,600	.0	....	....	15,300	4,600
Bolivia and Chile	175,000	175,000	.0	202,770	814,418	301,000	315,000
Brazil	3,570,600	2,254,700	.5	2,139,803	2,424,515	2,890,000	2,958,000
Colombia	2,971,700	2,971,700	.6	4,678,587	5,453,148	6,173,900	6,200,000
Ecuador	406,500	406,500	.1	346,853	545,674	560,000	710,000
Peru	492,200	492,300	.1	1,022,125	1,109,891	1,267.400	1,300,000
Uruguay	111,000	29,900	.0	15,276	11,836	12,000	10,000
Guiana—							
British	879,800	1,353,500	.3	1,126,500	923,892	660,700	600,000
Dutch	407,300	470,400	.1	503,400	449,054	438,200	400,000
French	3,050,600	3,050,600	.7	1,959,793	1,959,793	1,600,000	1,500.000
Venezuela	623,500	444,800	.1	612,796	1,395,349	1,269,900	637,000
Europe:							
Austria-Hungary	2,043,200	2,179,300	.5	200,744	1,392,465	1,000,000	1.000.000
Finland	....	900	.0	....	....	....	....
France	1,812,100	2,127,400	.5	1,400,000	1,400,000	1.000,000	700.000
Germany	78,100	135,600	.0	....	....	....	....
Great Britain	27,800	17,900	.0	20,238	19,266	5,700	5,000
Greece	....	....	.0	....	....	....	....
Italy	11,000	17,200	.0	32,145	2,295	2,000	2,000
Norway	....	....	.0	....	....	....	....
Portugal	2,300	2,300	.0	2,336	661	....	....
Russia and Siberia	22,199,000	26,507,800	5.8	28,586,392	26,322,746	22,500,000	18,000,000
Serbia	251,100	328,000	.1	116,000	....	....	....
Spain	....	....	.0	....	....	....	....
Sweden	20,300	17,600	.0	54,304	25,323	12.200	10.000
Turkey	500	500	.0	475	475	....	....
Australasia:							
British New Guinea	....	377,200	.1	377,757	....	....	....
New South Wales	3,416,900	3,093,200	.7	2,573,788	2,738,958	2,235,600	....
Northern Territory	110,300	64,500	.0	52,341	20,351	12,400	....
Queensland	7,192,700	5,493,200	1.2	5,134,779	5,161,911	4,447,800	....
South Australia	136,300	135,500	.0	145,778	125,701	160,600	....
Victoria	9,925,200	8,990,800	1.9	8,541,972	6,802,359	5,305,500	35,945,500
Western Australia	26,514,900	27.165,700	5.9	25,487,891	25,014,928	21,941,000	....
New Zealand	6,428.100	7,102,700	1.5	4,712,226	8,740,567	5,836,000	....
Tasmania	785,000	690,400	.2	542,491	383,402	326,400	....
Tatua (Borneo)	....	....	.0	....	....	210,500	....
Asia:							
British India	11,055,700	12,178,000	2.6	11,378,400	11,522,457	11.206.500	10.756,800
China	3,658,900	3,658,900	.8	3,658,900	2,804,692	3.100,700	3,600,100
Chosen (Korea)	2,852,600	3,582,500	.8	3,309,870	3,739,477	4,122,400	4,444,000
East Indies—							
British	1,352,000	1,352,000	.3	(*a*)	(*a*)	(*a*)	(*a*)
Dutch	3,387,100	3,387,100	.7	4,480,853	3,100,000	3,000,000	2,818,000
Federated Malay States	....	282,400	.1	269,147	351,527	327,900	342,300
Formosa (Taiwan)	....	814,600	.2	952.806	1,143,017	1,001,200	1,033,000
Indo-China	74.700	74,700	.0	66,419	43,659	65,600	50,000
Japan	4,467,000	3,614,400	.8	4,679,358	5,386,066	5,185,600	4,562,200
Siam	56,500	56,500	.0	....	....	....	....
Africa	....	....	......	....	....	....	[b] 2,935,656
Abyssinia	....	497,200	.1	....	....	....	....
Belgian Congo	....	916,600	.2	1,029,189	1,029,189	2,315,500	2,000,000
Egypt	....	95,100	.0	126,842	144,910	130,000	....
Portuguese East Africa	....	....	.0	....	....	231.900	....
French East Africa	2,044,600	....	.0	43,414	43,414	31,300	....
German East Africa	....	253,200	.1	....	....	....	....
Madagascar	....	1,256,200	.3	1,169,055	1,381,354	965,000	1,000,000
Rhodesia	14,226,900	14,274,700	3.1	17,663,686	18,915,324	19,232,200	14,988,600
Sudan	....	192,700	.1	....	....	....	....
Transvaal, Cape Colony, and Natal	188,293,100	181,885,500	39.5	173,559,940	188,033,156	192,182,900	186,254,256
West Africa (Nigeria, Gambia, Gold Coast, and Sierra Leone)	7,286,000	7,955,300	1.7	8,404.670	8,304,551	7,860,100	7,435,488
Total	466,136,100	459,941,100	100.00	439,078,260	468,724,918	454,176,500	423,590,200

[a] Included in Dutch East Indies.

[b] African production undistributed.

NOTE.—The percentages given are based on the 1913 production with normal mining conditions, when the allied countries produced 91.3 per cent; the central powers, 0.6 per cent; and the neutral countries, 8.1 per cent.

working costs, and dividends, from 1887 to 1917, a period of 31 years, have been obtained by sworn statements to both Boer and British Governments. The average recovery and cost per ton for the total period have been computed in dollars in the table.

TABLE 4.—*The Witwatersrand gold-mining industry's progress.*[a]

[Official statistics showing annual tonnage milled, value of output, working costs, and dividends.]

Year.	Tons milled.	Yield.			Working costs.			Dividends.
		Total.	Per ton.		Total.	Per ton.		
		£.	*s.*	*d.*	£.	*s.*	*d.*	£
1887	25,000	81,045	...	...	...	...	...	12,976
1888	250,000	729,715	...	...	...	...	...	109,050
1889	575,000	1,300,514	...	...	...	...	...	430,666
1890	702,825	1,735,491	49	4	1,480,940	42	1½	254,551
1891	1,175,465	2,556,328	43	5	2,221,630	37	10	334,698
1892	1,921,260	4,297,610	44	7½	3,418,290	35	6	879,320
1893	2,215,413	5,187,206	47	0	4,231,848	38	4	955,358
1894	2,830,885	6,963,100	49	2	5,435,816	38	4	1,527,284
1895	3,456,575	7,840,779	45	4	5,793,927	33	5	2,046,852
1896	4,011,697	7,864,341	39	3	6,350,659	31	7	1,513,682
1897	5,325,355	10,583,616	39	7	7,876,435	29	6	2,707,181
1898	7,331,446	15,141,376	41	3	10,293,138	28	0	4,848,238
1899	6,639,355	14,093,363	42	3	11,606,968	...	...	2,946,358
1900	692,413	2,484,247	...	...	2,590,523	...	...	...
1901	412,006	1,014,687	49	2½	598,874	...	...	415,813
1902	3,416,813	7,179,074	42	0	5,057,948	25	9	2,121,126
1903	6,105,016	12,146,307	39	8	8,800,805	24	9	3,345,502
1904	8,058,295	15,520,329	38	6	11,664,359	24	4	3,855,970
1905	11,160,422	19,991,658	35	10	15,237,309	23	6	4,754,349
1906	13,571,554	23,615,400	34	6	18,049,431	22	2	5,565,969
1907	15,523,229	26,421,837	33	11	19,499,417	20	10	6,922,420
1908	18,196,589	28,810,393	31	5	20,273,620	18	0	8,536,773
1909	20,543,759	29,900,359	28	11	21,361,891	17	1	9,471,391
1910	21,432,541	30,703,912	28	6	19,487,807	17	7	8,876,085
1911	23,888,258	33,543,479	27	11	22,127,618	18	0	7,763,086
1912	25,486,361	37,182,795	29	0	24,504,700	18	8	7,952,994
1913	25,628,432	35,812,605	27	9	22,919,871	17	11	8,194,099
1914	25,701,954	34,124,434	26	6	21,943,692	17	1	8,073,436
1915	28,314,539	37,264,992	26	3	24,657,659	17	5	7,519,416
1916	28,525,252	38,107,909	26	8	25,763,270	18	1	7,095,066
1917	27,251,960	37,017,633	27	1	26,129,156	19	2	6,556,188
Total	340,369,669	£529,216,534	...	...	£369,377,601	...	...	£125,585,897
Equivalent value	...	$2,571,992,355	$7.55		$1,795,175,140	$5.27		$610,347,459

[a] From South Africa Newspaper.

The output from the Australian gold mines reached its maximum in 1903 of about $87,000,000 and has since gradually decreased. In 1916 the returns were only about $39,000,000.

The Canadian fields produced in 1900 about $28,000,000, but in 1917 only about $15,000,000.

The output from Russia, including Siberia, amounted to about $28,000,000 in 1914 and decreased to about $18,000,000 in 1917, according to such statistics as are available.

Rhodesia did not begin profitable mining until 1898. Since then the output has steadily advanced until in 1916 it amounted to about $19,000,000, but fell off in 1917 to about $15,000,000.

The total production of gold from the United States is given by the Director of the Mint as follows:

Value of gold produced in the United States.

From 1792 to 1847	$24,537,000
1848 to 1872	1,204,750,000
1873 to 1917	2,683,421,000
Total	$3,912,708,000

The yield up to 1847 was obtained from the eastern coast; from 1848 to 1872, largely from the placer mining in the West; and from 1873 to date, by combination of placer and lode mining and recovery of gold from copper and lead refineries. This table is interesting as showing the amount of gold mined before the discovery of gold in California.

GOLD STANDARD AND NEED OF GOLD.

The relation between high prices and the gold supply and the credit system are matters that economists have discussed at length at various times. Many of the leading economists in the country believe in the quantity theory of money, but apparently there are as many who do not. Although a depreciated currency such as existed in Russia caused prices to rise many times beyond their normal level, gold went to a premium in that country, and this premium kept pace with the depreciation of a currency that no longer had a substantial gold reserve behind it. In the latter part of 1917 ten times as many paper rubles could be bought with a given weight of gold as at the beginning of the war.

GOLD AS THE STANDARD OF VALUE.

Virtually all economists agree that some form of the gold standard should be maintained. Even those who have pronounced ideas as to the advisability of a different standard concur that it would be dangerous to attempt any drastic changes during the war and the readjustment period. The gold standard is a vital necessity in the regulation of foreign exchange, and shipments of gold to neutral countries should be encouraged to stabilize the value of our dollar, to insure confidence, and to promote business relations. The following is of interest in this regard:

> Employment and prosperity after the war are dependent upon confidence and good understanding in industry, and an attack upon the standard value would do inestimable injury to all classes. A period of falling prices has its perils to be foreseen and guarded against, but the conditions represent a normal and necessary reaction from an excessive movement in the other direction, and when the balance is restored confidence in the natural order is

restored, and the way is clear for prosperity on an assured basis. When arbitrary and impulsive legislation is resorted to there remains no basis upon which to calculate the future.[a]

As regards any single country, the gold standard has present, practical advantages in its simplicity and the fact that the monetary systems of the world, almost without exception, are based upon gold. This is favorable to international trade relations and exchange. The need of a common unit of value in the world's affairs is shown at the present time by the difficulties that have arisen from restriction of the free movement of gold. Experiences during the war have emphasized the ability of countries to carry on their domestic affairs without gold, but have shown with equal clearness the necessity of gold in international business. The settling of international balances is one of the chief monetary functions of gold. In the United States gold has been withdrawn from circulation, embargoes have been laid on export of the metal or of coin, and industrial use of gold has been greatly restricted. All of these measures emphasize the fact that those in authority recognize the need of a large gold reserve to maintain the financial integrity of the country.

The need of gold is fully recognized by the banks. The American Bankers' Association in convention at Chicago September 23, 1918, passed resolutions on the desirability of maintaining the gold production of the United States as follows:

> Whereas, the only form of relief that will prove effective and can be applied promptly is action by the United States Government in such form and by such method as may be deemed fit and proper under the circumstances, and
>
> Whereas, gold is the standard of value and the basis of all credit, and is of vital importance to the financial and commercial life of the Nation and of the world: Now, therefore, be it
>
> *Resolved*, That the American Bankers' Association in convention assembled respectfully requests and urges upon this Government of the United States the desirability of maintaining the production of gold to at least its prewar volume, and asks that steps be taken immediately to that end; and be it further
>
> *Resolved*, That the secretary of this association be, and he hereby is, instructed to send a copy of this resolution to the President of the United States, the Secretary of the Treasury, and the Secretary of the Interior, advising them of its adoption; and be it also further
>
> *Resolved*, That considering the great importance of this subject, this convention recommends to the executive council that the matter be referred to the Federal legislative committee and the currency commission for exhaustive study and such action as may be deemed necessary.

Production of gold is not a war necessity in the United States in the same sense as the mining of coal, iron, copper, and other base metals, or the maintenance of a high rate of output in certain other industries. It is essential, however, to preserve the confidence of the public in the national credit, and a persistent decline in gold production might cause the public to question the ability of the Government to pay bonds and other Government obligations in gold coin. The very raising of the question by the gold miners will tend to shake public confidence, and educational measures should be undertaken to offset any sense of insecurity arising from the arguments of those not fully conversant with economic principles.

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[a] Monthly Letter, National City Bank, New York, October, 1918.

BANK RESERVES AND NATIONAL CREDITS.

The amount of gold coin and bullion in the United States is given in the Bureau of the Mint Report for 1917 as approximately $3,100,000,000. This is a greater amount than has ever been held by any one country at any previous time, and it is sufficient, according to financial authorities to maintain our credit. The creation of the Federal Reserve banking system has made each dollar more serviceable than ever before and any measures which increase the efficiency of the dollar in active exchange have the same effect as increasing the number of dollars. It is not only the number of dollars but the velocity of their circulation that determines the work done by them. The Federal Reserve banks have power to meet sudden calls for funds through the issuance of Federal Reserve notes or through the reduction under emergency conditions of their cash reserves below the normal legal minimum. All this has made our currency much more elastic than before, but has also reduced the ratio of gold reserve to outstanding obligations.

EXPANSION OF CREDITS.

The following comment on the gold situation by Henry E. Cooper, vice president of the Equitable Trust Co., is of interest in regard to the expansion of credit in the world:

> The tremendous expansion of industries and finances in the second half of the nineteenth century and during the first years of the twentieth century and the increasing exigencies of commercial transactions have required the introduction of additional media of exchange besides money. * * *
>
> It is interesting to mention here that the authorized fiduciary issue of the Bank of England was secured before the war as follows:

£4, 450, 000	represented by the acquisition of the right of issue of other banks, lapsed since 1844, and secured on the general assets and on the estates of the shareholders of the provincial banks which have sold their right of issue to the Bank of England.
2, 984. 000	issued against securities (general assets and estates of shareholders) of the Bank of England, as authorized by the law of 1844 (7 and 8 Vict., cap. 32).
11, 015. 100	outstanding debt of the government to the Bank of England in 1844. which the government authorized to be included as an asset of the issue department.
18, 449, 100	

> Additional notes beyond the sum of £18.449.100 could be issued against gold coin and gold and silver bullion.

In France there is nothing in the law requiring that the notes of the Bank of France, which has the monopoly of issue since 1848, be covered by a certain amount of gold. The bank has no particular obligation to hold a metallic reserve against note issues. The maximum of issue is fixed by the Government and before the war amounted to 5,800,000,000 francs. The bank can issue notes against cash or against statutory discounts or loans. In other words, every note of the Bank of France has its counterpart either in the metallic reserve or in the portfolio of discounts or in loans.

In Germany the notes in circulation of the Reichsbank and of the other four banks of issue are secured by a fund, one-third their value, of gold coin and bullion, silver, copper, nickel, and Government notes (Reichskassenscheine), and two-thirds of bills discounted. The notes of the Reichsbank are redeemable in gold only as far as the provision of gold is sufficient at the time.

The Bank of Austria-Hungary holds foreign bills as part of the cover for its note issues.

As for our own country, it is to be remembered that, even before the introduction of Federal Reserve notes all fiduciary money was not based on gold and that a distinction was made between gold and silver certificates.

On the other hand, the sum total of public debts, which are considered to be deferred payments in gold, and are, therefore, another form of fiduciary notes, was constantly growing. The public debts of the United States, France, Great Britain, and Russia, which amounted to about $4,000,000,000 in 1844, had reached a total of nearly $12,000,000,000 in 1874, and hovered around the $13,500,000,000 mark in 1900. * * * The public debts alone of all nations of the world aggregated about $44,000,000,000 in 1912. * * *

Since the beginning of the war * * * public debts have increased by leaps and bounds. A recent estimate shows that they had reached approximately $110,000,000,000 for the principal allies, and $57,000,000,000 for the central powers. If to that we add $9,300,000,000, estimated total public debts of lesser nations, we will have an approximate general total of $176.300,000,000 public debt for the world as against $44,000,000,000 in 1912. And the increasing progression is far from having reached its maximum. Mr. Montgomery Bell, in the Journal of the American Bankers' Association, of July, 1918, estimates that by April, 1919, the total war expenditures of Great Britain, United States, and France will have reached about $105,000,000,000.

Table 5 following gives the approximate figures of the national wealth and the present indebtedness of the principal countries of the world, as published recently in the press by the Citizens' National Bank:

TABLE 5.—*National wealth and present indebtedness of the principal belligerents as compiled by the Citizens' National Bank of New York.*

(In millions; 000,000 omitted.)

	Wealth.	Present debt.	Per cent.
Japan	$28,000	$1,300	4.6
United States	250,000	15,000	6.0
Italy	25,000	7,000	28.0
France	65,000	23,000	35.4
Germany	80,000	31,000	38.7
Great Britain	90,000	36,675	40.7
Russia [a]	40,000	25,400	63.5
Austria-Hungary	25,000	20,000	80.0
Total	603,000	159,375	

[a] Russia's wealth seems underestimated.

RATIO OF GOLD RESERVE TO LIABILITIES.

Since the war began the demand for currency and for credit of all sorts has increased to such an extent that the ratio of gold reserves of the world has fallen far below what was formerly considered safe.

The total fiduciary circulation of the nations of the world has not yet been exactly estimated. The Federal Reserve Board at Washington recently estimated that the principal banks of issue of Great Britain, France, Italy, Russia, Austria-Hungary, and Germany had on December 1, 1917, nearly $30,000,000,000 in circulation, as compared with about $4,000,000,000 at the outbreak of the war. It is well to point out that since December, 1917, the circulation has further increased by billions, and that the above figures do not include treasury notes and other paper tenders now circulating all over the world.

Table 6 following gives the approximate amount of gold reserve in the principal countries of the world for different periods, and Table 7 gives comparative statements of leading banks of issue as compiled by the Federal Reserve Board.

TABLE 6.—*Approximate stock of gold in banks, public treasuries, and in circulation in principal countries of the world.*

(Figures in thousands; 000 omitted.)

Country.	1910 [a]	1915 [a]	1918 [b]
United States	$1,710,000	$2,299,454	$3,054,000
Austria-Hungary	357,100	[c] 296,300	52,398
British Empire:			
Australasia	199,100	249,527	....
Canada	108,200	170,560	....
United Kingdom	650,000	661,944	327,318
India	13,200	42,412	65,934
South Africa	65,400	32,572	....
Straits Settlements	2,200	1,665	....
Total	1,038,100	1,158,680	....
France	926,400	1,384,125	[d] 634,103
Germany	[e] 185,900	714,073	587,041
Italy	264,100	335,689	155,785
Japan	71,700	143,128	[e] 325,272
Russia	961,400	1,058,480	[f] 630,099
Turkey	131,900	291,197	....
Argentina	253,500	228,939	384,197

[a] Figures in first two columns are taken from Statistical Abstract of United States.
[b] Figures in last column from Financial Chronicle and from Federal Reserve Bulletin.
[c] In 1913 this amount is stated as $915,700.
[d] Exclusive of £81,484,340 held abroad.
[e] Federal Reserve Bulletin, August, 1918.
[f] No figures since Oct. 29, 1917.

TABLE 7.—*Comparative statement showing principal assets and liabilities of the leading central banks of issue at date specified.*

[In thousands of dollars; 000 omitted.]

	Federal Reserve Banks.		Bank of England.		Bank of France.		Bank of Italy.		German Reichsbank.		Bank of Netherlands.	
	Dec. 31, 1914.	July 26, 1918.	July 29, 1914.	July 31, 1918.	July 30, 1914.	July 25, 1918.	Dec. 31, 1914.	June 20, 1918.	July 31, 1914.	July 31, 1918.	July 25, 1914.	July 27, 1918.
ASSETS.												
Gold coin and bullion	241,321	1,962,572	185,567	327,318	799,279	655,128	236,633	159,161	298,261	558,653	65,140	287,479
Silver and other metallic reserve	17,823	8,800			120,689	53,491		14,914	65,409	28,659	3,307	3,133
Total metallic vault reserve	259,144	1,971,372	185,567	327,318	919,968	708,619	236,633	174,075	363,670	587,312	68,477	290,612
Gold held abroad		11,628				393,162						
Foreign credits						281,643	8,195	112,919				
Government securities:												
Bonds, consols, etc	205	40,090	143,343		41,019	41,067			7,960			
Short-term securities		16,922		374,969	963	663,920	105,865	868,999		440,663	5,003	5,091
Other Government securities	8,755	46,329			38,600	3,686,300		13,102				
Total	8,960	103,341	143,343	374,969	80,582	4,391,287	105,865	882,101	7,960	440,663	5,003	5,091
Notes of other banks of issue	4,624	11,277					[a] 5,416	29,700	2,740	745		
Loans and discounts	9,909	1,507,425	230,222	519,680	471,746	420,339	180,297	835,624	495,296	3,805,299	35,430	24,447
Advances on bullion and specie, securities, merchandise, etc					146,443	172,913	29,180	113,198	48,121	1,998	24,798	45,144
Securities	734						39,468	42,595	94,392	29,465	3,612	3,600
Sundry assets	9,237	13,245			77,173	247,735	28,618	30,262	51,901	435,823	928	39,831
Total	292,608	3,618,288	559,132	1,221,967	1,695,912	6,615,698	633,690	2,220,474	1,064,081	5,301,305	138,248	408,725
LIABILITIES.												
Capital paid in	18,051	76,441	70,822	70,822	35,222	35,222	34,740	34,740	42,840	42,840	8,040	8,040
Surplus		1,134	16,992	16,713	8,206	8,292	13,515	18,037	17,726	22,569	2,011	2,042
Government deposits		233,040	61,869	183,900	73,834	26,710	40,320	[b] 59,541	299,515	2,024,160	1,904	30,865
Other deposits	263,948	1,401,107	264,830	673,723	182,881	742,103	118,035	756,559				
Bank notes in circulation	10,000	1,881,919	184,566	276,760	1,289,885	5,625,577	417,352	1,465,731	692,442	3,023,671	124,796	365,719
Sundry liabilities		24,647	53	49	105,914	177,794	9,728	4,948	11,558	188,065	1,497	2,059
Total	292,608	3,618,288	559,132	1,221,967	1,695,912	6,615,698	633,690	2,220,474	1,064,081	5,301,305	138,248	408,725

[a] Includes $1,737,000 of foreign bank notes.

[b] Overdraft.

	Riksbank, Sweden.		Norges Bank, Norway.		National Bank, Copenhagen, Denmark.		Bank of Spain.		Swiss National Bank.		Bank of Japan.	
	July 31, 1914.	June 29, 1918.	July 31, 1914.	July 31, 1918.	July 31, 1914.	July 31, 1918.	July 24, 1914.	July 27, 1918.	July 23, 1914.	July 31, 1918.	June 30, 1914.	July 27, 1918.
ASSETS.												
Gold coin and bullion	24,746	69,144	14,405	32,902	24,410	50,859	105,798	413,728	34,753	73,847	258,757	325,272
Silver and other metallic reserve	1,408	366				646	143,063	130,374	3,656	10,495		
Total metallic vault reserve	26,154	69,510	14,405	32,902	24,410	51,505	248,861	544,102	38,409	84,342	258,757	325,272
Gold held abroad										4,550		
Foreign credits	13,564	9,199	8,166	16,566		17,149		18,774				
Government securities:												
Bonds, consols, etc	c 7,332	c 25,853	2,399	3,494			67,047	95,426		3,829	17,339	10,956
Short-term securities												485
Other Government securities							29,199	19,300			11,176	16,611
Total	c 7,332	c 25,853	2,399	3,494			96,246	114,726		3,829	28,515	28,052
Notes of other banks of issue	d 1,893				2,307							
Loans and discounts	42,303	62,737	23,690	844,970	27,098	60,425	152,579	168,372	18,099	56,925	76,061	20,697
Advances on bullion, and specie, securities, merchandise, etc		28,287			3,106				2,699	10,100		130,675
Securities		1,484				7,974		2,249	2,446	1,919	9,775	
Sundry assets	813	41,133			9,627			13,228	5,594	7,645	204,488	286,760
Total	92,059	238,203			66,548			861,451	67,247	169,310	577,596	e 791,456
LIABILITIES.												
Capital paid in	11,900	13,400			7,236			28,950	4,825	4,825	18,675	18,675
Surplus	2,975	3,350			2,199			5,404	471	664	18,551	19,944
Government deposits	18,440	29,925	3,859	19,933	5,496	22,731	96,931	f 1,905	28,819	22,104	254,585	371,371
Other deposits								230,370			10,913	18,069
Bank notes in circulation	54,367	178,895	32,859	99,744	39,525	97,908	373,557	568,267	83,176	137,759	274,854	362,616
Sundry liabilities	4,377	12,633			12,092			30,365	2,606	3,958	18	781
Total	92,059	238,203			66,548			861,451	67,247	169,310	577,596	e791,456

[c] Includes both Government and corporate securities.

[d] Includes foreign bank notes; also drafts and bills payable at sight.

[e] Does not include 59,017,000 yen =$29,419,975 of fractional paper currency, issued by the Government and reported among the bank's liabilities; also an equal amount held by the bank for redemption of said currency and reported among the bank's assets.

[f] Due from Government in current account.

NOTE.—For latest statements of the Russian State Bank (Oct. 29, 1917) and the Austro-Hungarian Bank (Dec. 7, 1917) see pages 244–245 of the Federal Reserve Bulletin for March, 1918.

RELATION OF CREDITS TO GOLD RESERVES.

It is hardly necessary to point out what happens when a national currency ceases to be exchangeable at will for a recognized standard of value. Russia at the present time offers a spectacular example. The paper rouble, normally 51.2 cents, when no longer exchangeable for gold, depreciated to below 8 cents, and quantities of the so-called Kerensky roubles were sold at 2 cents. Russian bonds likewise fell to a small percentage of their normal value. Mexico's currency depreciated until 350 to 400 pesos were required for a dollar in American gold. There is no comparison between conditions which existed or are existing in Mexico and Russia with conditions in the United States and other allied countries. However, the situation which brought about the depreciation and practically the repudiation of Mexican and Russian currency was the issuance of great amounts of paper money without sufficient gold to cover them by these Governments—this emphasizes the necessity of maintaining an adequate reserve in the United States. The following extract from the Monthly Bulletin of the National City Bank of New York for October, 1918, is a clear statement of the situation:

> While the war goes on credit will be artificially elastic in order that the necessities of the Government may be met, and the risk of credit expansion is minimized, as stated above, by the fact that Government credit is so largely behind the situation; but when the war ends this reduction in the output of gold is bound to make itself felt in the credit situation. The normal additions to banking reserves will not be made, and credits will be correspondingly restricted, with the result that prices will decline. The influence is the reverse of that which has been seen from rapidly increasing bank reserves. * * *
>
> The amount of bank credit available before the war was related to the bank reserves, and the level of prices the world over was adjusted to this relationship. It is possible, temporarily, by the use of Government credit, to sustain a higher level of prices without a corresponding increase of gold reserves, but this can not be done permanently. The circulating credit must be freely convertible into the standard value if prices are to have any definite relation to the standard, or if prices in different countries are to have any definite relation to each other.

In an article on The Abuse and Use of Credit, published in the November, 1918, issue of System, the Hon. W. P. G. Harding, governor of the Federal Reserve Board, makes this statement:

> The supply of banking credit is not unlimited, and this credit, to remain sound, must be founded upon an adequate gold reserve. Should we abandon this basic principle we should invite financial disaster in the future.
>
> The Nation is spending nearly two billions a month for war; that is largely a credit operation. In addition, a very large amount of credit is required for those industries without which the civil population can not function.

With such heavy demands it has become necessary to conserve credit in order that financial soundness may be preserved. Too free use of credit will affect us in at least these four ways:

1. It will make credit for war purposes more difficult to obtain and consequently higher in price.
2. It will tend to force prices to greater heights, because civilian business will then be able to compete with the Government and they will bid against each other. This will increase the cost of living and also the cost of the war.
3. It will impair the strength of our gold reserve, which must be maintained, as we are to remain upon a gold basis.
4. Our gold will be one of our strongest assets after the war and any course which now affects that reserve will hamper us in getting back to a normal peace basis.

TRADE BALANCES.

Table 8, following, gives the amount of money in circulation in the United States, total bank deposits, bank clearings, and value of merchandise exports and imports from 1900 to 1917, inclusive.

TABLE 8.—*Relation of money in circulation to foreign trade.*[a]

(Figures in thousands; 000 omitted.)

Year.	Total money in circulation.	Circulation per capita.[b]	Total individual deposits.[c]	Total bank clearings.[d]	Merchandise imports, total value.	Merchandise exports, total value.
1900	$2,055,150	$26.93	$7,238,986	$84,582,450	$849,941	$1,394,483
1901	2,175,307	27.98	8,460,642	114,819,792	823,172	1,487,764
1902	2,249,390	28.43	9,104,722	116,021,618	903,320	1,381,719
1903	2,367,692	29.42	9,553,693	113,963,298	1,025,719	1,420,141
1904	2,519,142	30.77	10,000,546	102,356,435	991,087	1,460,827
1905	2,587,882	31.08	11,350,739	140,592,087	1,117,513	1,518,561
1906	2,736,646	32.32	12,215,767	157,681,259	1,226,562	1,743,864
1907	2,772,956	32.22	13,099,635	154,476,830	1,434,421	1,880,851
1908	3,038,015	34.72	12,784,511	126,238,694	1,194,341	1,860,773
1909	3,106,240	34.93	14,108,039	158,877,192	1,311,920	1,663,011
1910	3,102,355	34.33	15,283,396	168,986,664	1,556,947	1,744,984
1911	3,214,002	34.20	15,906,274	159,539,539	1,527,226	2,049,320
1912	3,284,513	34.34	17,024,067	168,685,953	1,653,264	2,204,322
1913	3,363,738	34.56	17,475,764	173,193,009	1,813,008	2,465,884
1914	3,402,015	34.35	18,517,732	163,849,811	1,893,925	2,364,579
1915	3,569,219	35.44	19,225,766	163,098,715	1,674,169	2,760,589
1916	4,024,130	39.29	22,882,433	242,235,794	2,197,883	4,333,482
1917	4,763,575	45.74	26,295,721	303,997,997	2,659,355	6,290,103

[a] Figures from Statistical Abstract of the United States, and U. S. Mint Reports.
[b] In dollars.
[c] National banks to June 30; other banks various dates of each year.
[d] Year ending Sept. 30.

It is of great interest to study the changes that have occurred in our foreign trade relations. In 1913 our exports were about $2,465,884,000 and imports of $1,813,008,000. These increased in 1917 to $6,290,000,000 and 2,659,000,000, respectively. We have been accustomed to have a mercantile balance in our favor and we want to increase our exports. This is a matter that has a direct bearing upon our gold reserves and the gold standard. The following excerpt from an address on our foreign relations by John D. Rovensky, vice president of the National Bank of Commerce, New York, at the American

Institute of Banking, Denver, September 19, 1918, is of special interest in this regard.

At the present time our international financial position is about as follows:

Prior to the outbreak of the war, there were held abroad in the form of stocks, bonds, and other securities about $4,000,000,000. In addition foreigners resident abroad owned property in the United States worth about $1,000,000,000; in other words, the amount of foreign capital invested in this country at that time was, roughly, about $5,000,000,000. Since the outbreak of the war the net imports of gold amount to about $1,000,000,000. This makes a total on the debit side of our balance sheet of about $6,000,000,000.

On the other side of the sheet we find the following:

American citizens owned foreign securities and other property worth about $1,500,000,000. During the war, up to July 1, 1918, we exported more than we imported merchandise to the extent of about $10,000,000,000. We exported more than we imported silver during the same period to the amount of about $200,000,000.

From this it will be seen that we are to-day a creditor nation to the extent of more than $5,750,000,000.

Table showing change in the international financial situation of the United States since the outbreak of the war.

	In millions of dollars.	
	Dr.	Cr.
United States securities held abroad at beginning of the war	$4,000	------
United States property owned by nonresident foreigners	1,000	------
Excess of gold imports over exports, July 1, 1914–July 1, 1918	1,040	------
Foreign securities and other property owned by American citizens at beginning of war	------	$1,500
Excess of merchandise exports over imports July 1, 1914–July 1, 1918	------	10,110
Excess of silver exports over imports July 1, 1914–July 1, 1918	------	195
Using this estimate as a basis, we are now a creditor nation to the extent of	5,765	------
	11,805	11,805

The merchandise-trade balance plus the silver-export balance amounted to a little over $10,000,000,000. In turn for this we received gold to the extent of about $1,000,000,000; we had returned to us about $2,000,000,000 of our own securities that had been held abroad, and we arranged to loan our allies and other foreign countries about $7,500,000,000. This makes a total of $10,500,000,000. The difference between this figure and the export balances mentioned above amounts to a quarter-billion dollars. This amount is probably represented by loans that have been made to allies and others and have not yet been used, increase in cast balances of foreign banks in the United States, merchandise paid for and not yet exported, etc.

Table showing net foreign trade balances and method of financing same since July 1, 1914.

	In millions of dollars.	
Excess of merchandise exports over imports, July July 1, 1914 to July 31, 1918	$10, 110	
Excess of silver exports over imports, July 1, 1914 to July 31, 1918	195	
		$10, 305
Excess of gold imports over exports, July 1, 1914 to July 31, 1918	1, 043	
United States securities repurchased Jan. 31, 1915 to Jan. 31, 1917	1, 743	
United States securities repurchased since Jan. 31, 1917 (estimated)	250	
Loans by United States Government to allies and other countries up to Aug. 1, 1918, less unavailable balances of loans and less $60.000,000 credit by Argentina	6, 029	
Loans by individuals to foreign countries to Aug. 31, 1918	1, 500	
		10. 565
Balance		260

PRODUCTION, EXPORTS, IMPORTS, AND CONSUMPTION.

Table 9 following gives the worlds' production of gold, the United States' production, and figures of export, import, and consumption for coinage and manufactures for the years 1900 to 1917, inclusive. Diagram 4 (Pl. I) shows the net figures of new gold received from different sources in the United States and the amount used in industrial arts, the shaded portion between the two lines being the amount available for coinage and reserves.

TABLE 9.—*Gold production and consumption.*

(In thousands of dollars; 000 omitted.)

Year.	World production.[a]	United States production.[a]	Imports.[b]	United States exports.[b]	United States consumption.[a]		United States total stock.[a]	Increase and decrease. (By difference.)
					Coinage.	Manufacturing and arts.[c]		
1900	$254, 576	$79, 171	$44, 573	$48, 266	$107, 937	$22, 148	$988, 768	....
1901	260, 992	78, 666	66, 051	53, 185	99, 065	23, 868	1, 049, 639	$60, 871+
1902	296, 737	80, 000	52, 021	48, 568	61, 980	27, 682	1, 120, 530	70, 891+
1903	327, 702	73, 591	44, 982	47, 090	45, 721	29, 063	1, 191, 685	71, 155+
1904	347, 377	80, 465	99, 055	81, 459	208, 618	28, 655	1, 216, 821	25, 136+
1905	380, 288	88, 180	53, 648	92, 594	79, 983	33, 208	1, 287, 568	70, 647+
1906	402, 503	94, 373	96, 221	38, 573	53, 002	39, 126	1, 458, 323	170, 755+
1907	412, 966	90, 436	114, 510	51, 399	79, 622	40, 727	1, 612, 689	154, 366+
1908	442, 837	94, 560	148, 337	72, 432	197, 238	31, 476	1, 656, 149	43, 460+
1909	454, 059	99, 673	44, 003	91. 531	108, 180	37, 628	1, 638, 649	17, 500−
1910	455, 239	96, 269	43, 339	118, 563	47, 578	41, 787	1, 710, 035	71, 386+
1911	461, 980	96, 890	73, 607	22, 509	118, 925	40, 834	1, 799, 627	89, 592+
1912	466, 136	93, 451	48, 936	57, 328	12, 749	43, 977	1, 880, 237	80, 600+
1913	459, 941	88, 884	69, 194	77, 762	30, 058	45, 864	1, 904, 694	24, 457+
1914	439, 078	94, 531	66, 538	112, 038	26, 625	45, 520	1, 805, 098	99. 596−
1915	468, 724	101, 035	171, 568	146, 224	40, 533	37, 820	2, 299, 454	494, 356+
1916	457, 006	92, 590	494, 009	90, 249	31, 077	51, 061	2, 866, 965	567, 511+
1917	423, 590	83, 750	977, 176	291, 921	1, 030	....	3, 041, 500	174, 535+
1918	400, 000	[d] 74, 000	....	....	....	....	....	....

[a] United States Mint Reports.
[b] Statistical Abstract of United States, 1917.
[c] Including old material.
[d] Estimated.

HOARDED GOLD.

There is a tendency among certain classes of people to hoard gold in one form or another. While this tendency is most evident in oriental countries, it also applies in less degree to all countries. This is shown by comparing the production of gold for different years and the increase in gold reserves, which is not proportionate. Money which circulates slowly or not at all is hoarded money, and gold held in the form of jewelry, plate, or various kinds of ornaments and fancy articles may also be called hoarded gold. Large amounts of gold go into the manufacture of articles of jewelry and other industrial uses. Tables given herein show the amount consumed in this way in the United States to greatly exceed that used for coinage purposes during the last six years.

GOLD STOCK IN UNITED STATES.

A study of total figures of gold production and of gold reserves brings out some interesting facts. The total amount of gold produced in the United States from 1792 to the end of 1916 was approximately $3,828,000,000. The total stock of coin and bullion held in the United States at the end of 1917 was over $3,100,000,000. The total coinage of gold in the United States since the organization of the mint to the end of 1916 has been $3,410,000,000. Some of this gold has been lost or shipped to foreign countries to be in part recoined and some is still hoarded. In addition to the amount of gold held in reserve in the Treasury and the Federal Reserve banks, it is estimated that the amount of gold held in private banks and in possession of individuals, June 30, 1917, is in excess of $350,000,000. ' From these figures, it is evident there is in the United States at the present time probably more gold than has been produced by our mines since records of production have been kept.

IMPORTS AND EXPORTS OF GOLD AND SILVER IN PRINCIPAL COUNTRIES.

The following table (No. 10) of total imports and exports of gold and silver by countries for the fiscal year 1917–18 is taken from the June (1918) Bulletin issued by the Bureau of Foreign and Domestic Commerce. Figures given for Canada, however, indicate previous shipments to that country from England.

Bureau of M

Diagram sho

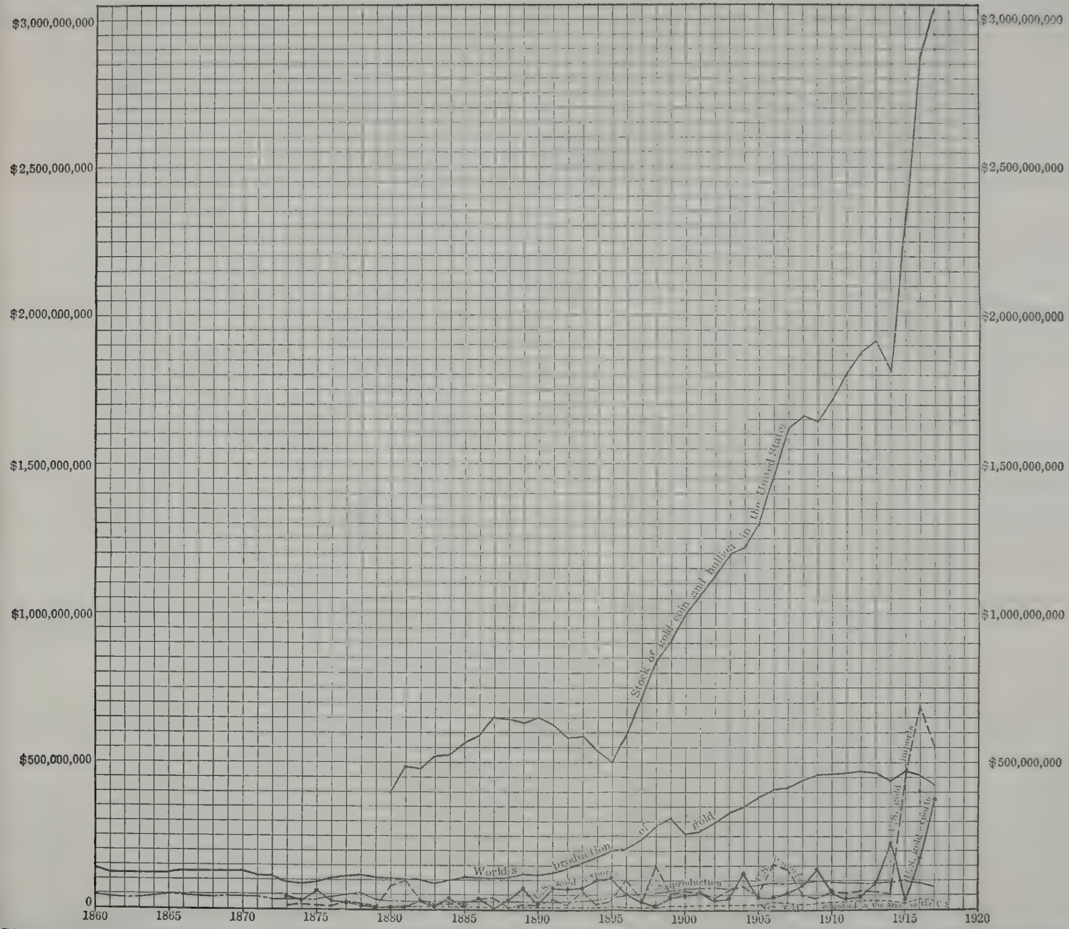

Diagram showing the relative magnitude of variation in the production, consumption in the arts, imports, exports, and domestic stock of gold. Based on the reports of the Director of the Mint and of the U. S. Geological Survey.

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TABLE 10.—*Total imports and exports of gold and silver, by countries, during June and the 12 months ending June, 1917 and 1918.*

Countries.	Gold.				Silver.			
	June.		12 months ending June—		June—		12 months ending June—	
	1917	1918	1917	1918	1917	1918	1917	1918
Imports:								
France	....	....	$40,962	$6,872	....	....	$9,525	$14,507
United Kingdom—England	....	....	46,353,160	7,235	....	$7,800	57,352	158,822
Canada	$89,402,755	$30,912,378	884,068,480	102,968,631	$509,732	528,051	5,651,813	9,264,695
Central American States	290,360	253,405	3,305,636	3,292,610	124,369	134,630	2,570,403	2,860,127
Mexico	255,254	421,607	8,295,884	5,836,818	1,026,505	4,217,195	16,232,562	47,203,038
West Indies	26,519	41,398	379,491	276,098	13,442	141,779	459,354	268,073
Brazil	1,241	2,832	30,638	1,371,919	332	....	28,073	7,529
Chile	28,808	7,586	211,964	206,639	34,865	115,579	1,685,009	2,013,585
Colombia	472,678	189,257	4,967,230	4,131,805	13,885	12,101	175,768	275,020
Peru	50,103	19,271	790,222	851,637	477,486	171,637	6,789,547	6,177,864
Venezuela	185,385	6,480	1,636,615	129,675	932	....	3,711	2,189
China	....	....	....	176	....	....	218.110	....
East Indies—Dutch	323,645	....	1,342,896	2,377,285	28,507	....	710,101	1,202,409
Japan	....	....	98,213	....	....	....	77,890	8
Australia and New Zealand	....	....	22,512,890	....	....	....	....	....
All other countries	302,303	37,807	3,141,745	2,653,083	5,381	22,414	334,345	880,287
Total	91,339,051	31,892,021	977,176,026	124,413,483	2,235,436	5,351,186	35,003,563	70,328,153
Exports:								
France	....	....	71,582	48,607	....	2,123,336	395,000	2,971,466
Spain	15,983,400	....	70,360,711	18,344,521	....	....	....	....
United Kingdom—England	....	....	737,979	....	2,096,727	3,466,281	50,079,581	22,855,629
Canada	2,538,626	21,105	11,473,786	5,750,537	113,214	80,296	1,624,693	2,649,061
Mexico	1,503,903	2,631,497	5,161,741	22,805,927	610,274	323,697	1,379,640	2,079,934
West Indies—								
Cuba	1,300,020	....	22,843,420	1,250,616	....	....	1,750	400
Other West Indies	....	....	389,500	....	5,385	8,975	29,670	86,898
Argentina	2,250,000	....	43,712,000	3,186,000	....	2,708	12,020	179,844
Chile	....	....	2,251,399	2,203,716	....	....	....	....
Peru	....	....	7,339,276	8,683,685	....	....	309,274	....
Uruguay	1,240,000	....	4,090,000	1,060,000	....	....	....	....
Venezuela	456,000	47,500	4,004,900	1,371,120	....	....	....	....
China	....	....	701,605	....	774,318	101,000	7,609,747	16,479,746
British India	2,700,000	....	3,715,588	11,991,586	3,221,416	1,921,238	11,267,106	71,755,974
Hongkong	51,925	....	1,618,215	571,780	2,115,274	534,440	4,891,189	12,943,700
Japan	38,413,250	....	110,507,313	70,542,191	....	....	184,000	....
All other countries	727,144	1,000	2,942,180	3,035,938	28,126	1,300	495,961	7,178,747
Total	67,164,268	2,704,102	291,921,225	190,852,224	8,964,764	8,566,271	78,279,931	139,181,399

SOURCE OF GOLD IN THE UNITED STATES.

Although there are over 5,000 mines producing gold in the United States, including all placers and all copper, lead, and other mines from whose ores gold is recovered as a by-product, more than 50 per cent of the total gold is won from less than 50 mines. Twenty-five per cent of the total was obtained from 1,500 placers, many of them small but several large enough to be included among the 50 principal gold mines.

The following table gives a list of the largest producers of gold in the United States in the approximate order of output in 1917. The domestic supply of gold comes chiefly from ores treated in gold-quartz mills by amalgamation or cyanidation, or both, and from placers gravel mostly from dredging. These sources accounted for about 88 per cent of the total gold production.

In addition to the gold won from gold mines, a large quantity of gold has come from copper, lead, and zinc mines as a by-product. Nine per cent of the total gold production in the United States in 1916 came from copper mines, and probably over 10 per cent of the gold to be won in 1918 will come from this source. About 2.6 per cent of the total gold production came similarly from lead and zinc and mixed ores. In all of the above sources of supply gold is a by-product, and mines producing it have been benefiting by largely increased prices on the main metal content of their ores. They need not be given further attention in this study of the situation.

Largest producers of gold in the United States in 1917, in order of output.

Operator.	State.	Mining district.	Source of gold.
Homestake Mining Co	South Dakota	Whitewood	Dry or siliceous ores.
Yuba Consolidated Goldfields	California	Marysville	Dredging gravels.
Cresson Consolidated Mining Co	Colorado	Cripple Creek	Dry or siliceous ores.
Portland Gold Mining Co	do	do	Do.
Alaska Gastineau Mining Co	Alaska	Juneau	Do.
Empire Mines	California	Grass Valley	Do.
United Eastern Mining Co	Arizona	Oatman	Do.
Vindicator Consolidated Gold Mining Co	Colorado	Cripple Creek	Do.
Goldfield Consolidated Mines Co	Nevada	Goldfield	Do.
North Star Mines	California	Grass Valley	Do.
Yukon Gold Co	Alaska	Ruby and Iditarod.	Dredging gravels.
Utah Copper Co	Utah	West Mountain	Copper ores.
Argonaut Mining Co	California	Grass Valley	Dry or siliceous ores.
Tomboy Gold Mines Co	Colorado	Upper San Miguel	Do.
Liberty Bell Gold Mining Co	do	do	Do.
Marysville Dredge Co	California	Marysville	Dredging gravels.
Plymouth Consolidated Mining Co	do	Mother Lode	Dry or siliceous ores.
Kennedy Mining Co	do	Jackson	Do.
Barnes King Mining Co	Montana	Ottawa	Do.
Alaska United Mining Co	Alaska	Juneau	Do.
United Verde Copper Co	Arizona	Verde	Copper ores.
Calumet & Arizona Mining Co	do	Turquoise	Do.
United States Mining Co	Utah	West Mountain	Lead ores.
Anaconda Copper Mining Co	Montana	Summit Valley	Copper ores.
Tom Reed Gold Mines Co	Arizona	Oatman	Dry or siliceous ores.
Melones Mining Co	California	Angels Camp	Do.
Tonopah Belmont Mining Co	Nevada	Tonopah	Do.
American Gold Dredging Co	California	Oroville	Dredging.
Natomas Co. of California	do	do	Do.

MINE PRODUCTION BY STATES.

The following table (No. 11), prepared by the United States Geological Survey, gives the source of mine production of gold in the United States in 1916. These figures represent mine returns and do not necessarily check with mint and refiners' figures given in Tables 3 and 12.

TABLE 11.—*Mine production of gold in the United States, 1916, in fine ounces.*[a]

State or Territory.	Placers.	Dry or siliceous ores.	Copper ores.	Lead ores.	Zinc ores.	Copper-lead and copper-lead-zinc ores.	Lead-zinc ores.	Total.
Alabama	37.59	380.85						418.41
Alaska	538,897.50	286,028.60	9,141.76					834,067.86
Arizona	690.84	73,414.67	105,467.71	5,793.20	3,836.77	1,564.78	2,033.44	192,801.41
California	414,847.40	574,515.59	44,644.11	1,717.51	19.98			1,035,744.59
Colorado	34,487.70	847,876.76	15,220.87	22,687.40	330.62	1,724.04	4,238.70	926,566.09
Georgia	368.91	721.41						1,090.32
Idaho	21,724.87	25,496.72	3,619.47	2,572.87	4.01	5.66	553.70	53,977.30
Montana	34,982.82	135,427.26	38,235.21	2,066.39	3,812.29	681.60	4,924.58	220,130.15
Nevada	17,139.89	351,420.33	56,880.78	3,046.56		29.60	387.05	428,904.21
New Mexico	537.74	54,360.53	11,336.28	319.29	298.63	25.00		66,877.47
North Carolina	381.83	878.54	8.85					1,269.22
Oregon	42,208.01	47,415.10	2,234.82	159.98				92,017.91
South Carolina	15.48							15.48
South Dakota	102.12	360,798.54		7.99				360,908.65
Tennessee		277.63						277.63
Texas			6.01	14.02				20.03
Utah	60.47	9,122.41	113,396.52	33,535.63		421.68	16,401.35	172,938.06
Virginia		4.11	38.70					42.81
Washington	400.40	26,979.03	563.76	.87				27,944.06
Wyoming	16.88	923.55	54.45					994.88
Total, 1916	1,106,900.45	2,796,041.63	400,849.30	71,921.71	8,302.30	4,452.36	28,538.82	4,417,006.57
Value	$22,881,663	$57,799,310	$8,286,290	$1,486,754	$171,624	$92,039	$589,950	$91,307,630
Percentage of total	25.06	63.30	9.07	1.63	0.19	0.10	0.65	
Total, 1915	1,077,432.25	3,212,297.79	343,225.93	81,448.66	4,974.50	2,496.30	29,599.21	4,754,474.67
Value	$22,272,501	$66,404,089	$7,095,110	$1,745,709	$102,832	$51,603	$611,870	$98,283,714
Percentage of total	22.66	67.57	7.22	1.78	0.10	0.05	0.62	

[a] Philippines and Porto Rico not included.

Gold mining in the United States reached the peak of production in 1915 with $101,035,700. This was also the banner year in the world's production, with $468,724,918. Very little increase had been shown for the 10 years previous to 1915.

Since 1915 the production of gold has been decreasing rapidly. The world's output in 1917 was about 9½ per cent lower than that of 1915, and this committee estimates that the world's production for 1918 will be 15 per cent or more lower than that of 1915. The decrease in the production of gold in the United States is greater in proportion than the decrease of the world's production. The estimated output in 1918 in the United States is about 30 per cent less than that of 1915.

In order to show some of the causes of the decrease in production the following outline of the gold industry in the more important gold-producing States is given, figures of production being obtained through the United States Geological Survey.

PRODUCTION IN 1917 AS COMPARED WITH 1916.

The production of gold in the United States in 1917 was $83,750,700, and was $8,839,600 less than in 1916, as compared to a decrease of $30,000,000 in the world's production. Part of this decrease was due to working out of ore or to the lower grade of the ore mined, and part to the scarcity of labor and the increased cost of supplies, which prevented operations of normal capacity at low-grade mines.

Table 12 following shows the gold production by States for 1917, the number of producing mines, and the increase or decrease as compared to 1916. The principal gold-producing States are California, Colorado, Alaska, South Dakota, Nevada, Arizona, Montana, and Utah, in the order of output. These States produced more than 90 per cent of the gold output in 1917.

TABLE 12.—*Approximate distribution of gold production of the United States in 1916 and 1917, and number of producing mines.*

(Mint and refiner's report.)

State.	Gold.			Number of mines, 1917.	
	1917	1916	Increase (+), 1917; decrease (−), 1917.	Placer.	Deep.
Alabama	$2,200	$7,400	− $5,200		1
Alaska	14,671,400	16,124,800	−1,453,400	810	40
Arizona	5,180,600	4,092,800	+1,087,800	32	452
California	20,929,400	21,980,400	−1,051,000	249	241
Colorado	15,974,500	19,185,000	−3,210,500	33	715
Georgia	6,500	20,400	− 13,900	13	6
Idaho	754,800	1,058,300	− 303,500	112	247
Illinois					2
Maryland					3
Michigan					10

TABLE 12.—*Approximate distribution of gold production, etc.*—Continued.

State.	Gold.			Number of mines, 1917.	
	1917	1916	Increase (+), 1917; decrease (−), 1917.	Placer.	Deep.
Missouri	$300	....	+ $300	....	4
Montana	3,673,200	$4,328,400	− 655,200	99	518
Nevada	6,932,500	9,064,700	−2,132,200	91	852
New Mexico	1,085,400	1,350,000	− 264,600	16	176
North Carolina	10,800	23,000	− 12,200	11	7
Oregon	1,687,300	1,901,500	− 214,200	53	23
Philippines	1,446,100	1,514,200	− 68,100	(a)	(a)
Porto Rico	100	600	− 500	(a)	(a)
South Carolina	1,700	300	+ 1,400	2	1
Tennessee	5,500	5,700	− 200	....	7
South Dakota	7,372,900	7,471,700	− 98,800	7	23
Texas	100	500	− 400	....	9
Utah	3,522,100	3,859,000	− 336,900	3	331
Vermont and New Hampshire	100	300	− 200	....	3
Virginia	1,300	500	+ 800	....	5
Washington	488,200	580,600	− 92,400	17	119
Wyoming	3,700	20,200	− 16,500	1	16
Total	83,750,700	92,590,300	−8,839,600	1,552	3,811

[a] Unknown.

The above figures represent the gold actually produced in marketable form at mills, smelters, and refineries and may differ from the mine figures for the same years, which represent the gold in placer and mill bullion and smelter receipts of ore mined during the year, but not necessarily all treated in the same year.

In the following pages are given the production in 1917 and 1916, the increase or decrease in the more important gold-producing States, and an outline of the causes operating in each. The figures for 1917 represent the preliminary mine returns to the United States Geological Survey and do not necessarily check with the figures from the Mint and Refiners' Report, as given in Table 12, which are final, and for refined or marketable metal. In States where placer production is an important factor the reports for placer and for deep mines are given separately.

ARIZONA.

The gold production in Arizona in 1917 was $5,068,193, whereas in 1916 it was $3,985,559, showing an increase of $1,082,634.

The United Eastern mine, in the San Francisco district of Mohave County, produced heavily and is responsible for the large increase in gold production. The Gold Road property, formerly an important producer, has ceased operations, although there is said to be a large body of ore that can not be worked under present conditions, but which could be mined at prewar costs. More than 13 cents per ton was recovered from over 15,000,000 tons of copper ore treated.

IDAHO.

Placer mines.—In Idaho the gold output from placer mines in 1917 was $135,231, whereas in 1916 it was $449,093, a decrease of $313,862. The Boston Idaho dredge at Idaho City, which formerly produced one-third of Idaho's gold, worked out the placer ground owned by the company and the dredge may be moved to ground near by. The exhaustion of this ground was the principal cause of the decrease of the gold output in the State. In the Cœur d'Alene district the Yukon Gold Co.'s dredge commenced operations in December, 1917, and this dredge will be an important producer in 1918.

Deep mines.—The production of gold from deep mines in Idaho in 1917 was $669,578, and in 1916, $666,717, showing an increase of $2,861. One mine in the Marshall Lake district of Idaho County is responsible for the increase. In many of the old gold camps in central and southern Idaho all of the free-milling ores have been exhausted and the remaining material is too complex to treat by known methods. Some of the mining districts in central Idaho are remote from the railroads and little has been done in the way of building roads to these districts. In many parts of Idaho the problem of increased gold production will be dependent largely on improving conditions in metallurgical treatment.

MONTANA.

Placer mines.—Montana placers produced $467,063 worth of gold in 1917 and $723,159 in 1916, a decrease of $256,096. The decrease is mostly due to lower-grade ground worked at the Conrey placers at Ruby and to the closing down of one of the company's dredges. The ground of this company is rapidly being exhausted and there are no new known fields for future dredging operations in Montana.

Deep mines.—The value of gold produced from deep mines in Montana in 1917 was $3,050,190, and in 1916, $3,827,335, a decrease of $777,145. The decrease is partly due to impoverishment and exhaustion of ore bodies, one mine, formerly a producer of over half the amount represented by the decrease, having ceased operations in 1916. The grade of the ore and concentrates shipped to smelters was also lower than in 1916.

NEVADA.

Placer mines.—In Nevada the placer production in 1917 was $292,584, whereas in 1916 it was $354,313, a decrease of $61,729. The Manhattan placers in Nye County showed the largest decrease, possibly because high wages in other camps attracted the placer miners away.

Deep mines.—The production from the deep mines in 1917 was $6,666,884, and in 1916, $8,511,924, a decrease of $1,854,040. In Nevada the largest part of the gold is recovered from gold and silver ores, the production being largely affected by the constantly decreasing value of the ores in the largest gold producer, the Goldfield Consolidated.

UTAH.

Utah's production of gold from all mines in 1917 was $3,355,156 and in 1916, $3,574,947, a decrease of $219,791. Utah has no large producer of gold ore, and most of the gold is derived from copper and lead ores. The decrease in the smelter production of gold was due to freight and smelter embargoes and increased freight charges on ores. The Maryville district is the only one in Utah which is strictly a gold producer. Labor in Utah commands high wages, and this is particularly true in out-of-the-way places. Besides the increasing cost of labor, there is great difficulty in obtaining labor of any kind. Practically all of the gold in Utah is a by-product of lead and copper smelting. Any means adopted for the assistance of the gold miners in other fields would have but small effect in Utah.

WASHINGTON.

In Washington the output of gold from deep and placer mines in 1917 was $492,324 and in 1916 $577,655, showing a decrease of $85,331. The Washington gold ores come mostly from the Republic district, which is served by railroads carrying siliceous ores to smelters in British Columbia and to smelters at Northport and Tacoma, Wash. The mills in that district have not been operated for the past two years, as the gold ore had additional value to the smelters on account of its silica content. The difficulty in marketing the ores because of labor troubles at the smelters and the high freight charges to Tacoma and British Columbia plants prevented lower-grade ores being shipped.

OREGON.

The output of gold in Oregon in 1917 was $1,491,798, and in 1916 $1,902,179, showing a decrease of $410,381. The output of 1916 was the largest recorded for 13 years. There was a decrease of $265,230 in the gold output of deep mines, which produced $764,432, and of $145,000 in that from placer mines. The placer production is mostly from dredges, and the decrease was due partly to the lower grade of the ground worked and partly to the shortage of water. No definite information has been received as to the causes of the decrease in output from the lode mines.

COLORADO.

In 1917 Colorado produced $15,849,302 worth of gold, and in 1916 $19,153,821, a decrease of $3,304,519. The Camp Bird mine, one of Colorado's largest gold producers, ceased production in 1916 and is at present only doing development work. Press reports indicate that ore has been found in deeper workings and that production will be resumed. Labor and other conditions in the Cripple Creek district are described in detail elsewhere. There was a substantial reduction in the grade of ore treated at some mines. Depletion of ore bodies, shortage of labor, and high cost of supplies resulted in curtailment of operations at many mines and the closing of others. The number of mines that reported production was 110 less than in 1916. In 1916 there were 3,000 laborers in the Cripple Creek camp, whereas in August, 1918, it was stated that there were less than 900. The greatest decrease was in the gold recovered from treating ore by cyanidation and from ore and concentrates shipped to smelters. A decrease of $60,000 in gold won from placer operations was recorded. Gold dredges produced $647,000 for the year and all other placer mines less than $14,000.

SOUTH DAKOTA.

In 1917 South Dakota produced $7,364,233 worth of gold, and in 1916, $7,460,644, a decrease of $96,411. More than 94 per cent of the gold produced in this State comes from the Homestake mine. The tonnage treated at this mine exceeded that of 1916. The grade of ore fell 14 cents per ton, but the total recovery was somewhat higher than that of the previous year. Only the small mines showed a decrease in gold production.

ALASKA.

The production of gold in Alaska in 1916 and 1917 was as follows:

	1917.	1916.	Increase or decrease.
Lode mines	$4,581,000	$5,912,736	—$1,331,000
Copper ores	265,900	188,977	+ 76,923
Placer mines	9,810,000	11,140,000	— 1,303,000

There was 3,414,700 tons of gold ore treated in 1917, which yielded $1.37 in gold and silver per ton, and 659,951 tons of copper ore which contained 40 cents per ton in gold. The decrease in the number of tons treated at the gold mines as compared with the tonnage treated in 1916 was only 134,000 tons, but the average recovery of gold fell from $1.67 per ton to $1.37, which accounts in part for the smaller production.

The flooding of the stopes at the Treadwell mine, causing the cessation of operations at the principal mines of that group, was responsible for the major part of the net total decrease in the production of gold from Alaska lode mines for the year. The Treadwell group of mines formerly produced over $2,000,000 a year; other mines, such as the Alaska Juneau mines and the Alaska Gold mine, made substantial gains as they mined more ore than in 1916. The decrease of $1,330,000 in the placer production was caused chiefly by the working of lower-grade ground, and further decrease will be shown from this cause in 1918, as one important placer was worked out in 1917 and another will be exhausted in 1918. The scarcity of labor and difficulty in obtaining supplies also contributed to the decreased production in placer districts. The dredges, 36 in number, produced $2,500,000, which was $179,000 less than in 1916.

CALIFORNIA.

The production of gold in California in 1917 amounted to $20,087,504, and in 1916 it was $21,410,741, showing a decrease of $1,323,297. The lode mines treated 184,000 tons of ore less than in 1916; the average gold content decreased from $5.47 a ton in 1916 to $5.13 a ton in 1917. The total decrease in gold production from deep mines was $1,822,000. The gold won from dredge operations was $8,313,527, an increase of $544,300 over 1916; this increase was due to the recent installation of several large dredges on the Yuba River.

There were 490 mines operating in 1917, as compared to 589 in 1916. La Grange, the famous hydraulic mine in Trinity County, shut down on account of the low grade of the remaining ground, which could not have been profitably worked even under prewar conditions. Some mines on the Mother lode and elsewhere ceased operations during 1918 on account of increased costs. Some of these mines have not been profitable of late, but were hopefully struggling on. The total production from them added over $3,000,000 to the gold output of California in 1916, and exceeded $2,000,000 in 1917. On account of the scarcity of electric power, the dredging companies curtailed their operations voluntarily during the summer of 1918 at the request of the railroad commission. It was estimated that this would reduce the production from dredging at least one-third for the latter part of 1918, but during September the ban on power was lifted. The cost of dredging is at present about 20 to 25 per cent in excess of normal cost, and will be still higher in 1919. The cost of lode or quartz mining in California increased about 30 per cent.

THE COST OF PRODUCING GOLD.

The gold-mining statistics for 1917, presented in Table 13 following, show that the average operating cost of producing a dollar at the largest lode mines in the United States was 70 cents. The actual cost varied from 51.5 to 90.7 cents in different States. Table 14 gives this information in more detail, figures for the most important mines whose operators answered the questionnaire sent out by the committee being combined for different States. This table gives comparative figures of tons of ore treated, recovery and operating cost for the prewar period and the present time, and also shows operating cost of producing a dollar of gold for each group. It would have been more interesting, perhaps, to have given these figures for individual mines, but the confidential nature of much of the data generously submitted by the companies precluded doing so. The average cost of producing a dollar at quartz mines in 1917 was 70 cents, as compared to 57 cents in 1913. The cost of producing a dollar by dredging in 1917 was 45.2 cents, a reduction of 3.4 cents from the cost in 1913, due to improvements in dredging machinery and the operation of larger dredges. The cost of producing a dollar by dredging for 1918 has been increased to 55.2 cents and the cost will be further added to in 1919.

Costs for the first six months of 1918 at lode mines are also higher than for 1917 and are steadily increasing. It must be realized that these costs do not take into consideration capital expenditure, interest on investments, depreciation of plant, depletion of ore reserves, etc., and it needs but a casual study to see that few gold mines at the present time offer inducement to capital.

The figures presented in the following tables are compiled from returns given in response to the questionnaire sent out by the committee to the leading gold producers of the United States requesting accurate figures as to mining costs, yields, and profits. The Bureau of the Mint and the United States Geological Survey have comparatively complete and accurate returns of outputs from gold mining. This information is, however, obtained by favor, as such reports are not now required by law in the United States. The returns here given are from certain mines only. No effort was made to obtain statistics from the smaller and less important mines, many of which keep no accurate records.

The committee, therefore, found that it has been seriously hampered by the difficulty in obtaining readily available, accurate, and essential data in regard to gold-mining operations. Not all of the companies make public their yields, costs, or profits, as in the Transvaal, and in fact some of the smaller operators, as above mentioned, do not keep records. There seems to be no reason for secrecy in gold-mining returns, as there is no competition in marketing the product. If the gold-mining companies were required by law to make periodical returns of their yields, costs, and profits to the Government, and if such information were made available to all, the industry as a whole could be better aided by the Government agencies.

TABLE 13.—*Gold-mining statistics for 1917.*

[Compiled by Charles Janin from questionnaire sent to largest producers.]

State.	Number of men.[a]	Number of tons treated.	Total recovery.	Tons per man per year.[a]	Recovery per ton.	Operating cost per ton.	Cost per dollar recovered [b] (cents).
Oregon	80	31,893	$311,410	100	$9.76	$6.77	69.3
California	2,141	939,131	6,140,530	438	6.54	4.26	65.2
Alaska	1,600	3,153,364	3,724,191	1,970	1.18	1.07	90.7
Colorado	1,760	1,152,714	8,037,218	654	6.97	4.71	67.5
South Dakota	2,176	1,677,623	6,609,442	720	3.94	2.99	75.9
Nevada[c]	1,300	866,983	8,498,658	666	9.80	6.88	70.1
Arizona	350	166,204	2,429,872	474	1.46	7.52	51.5
Montana	200	79,647	939,866	398	9.29	6.19	66.7
Total	9,607	8,067,559	36,691,187	840	4.54	3.19	70.4
State.	Number of men.	Cubic yards treated.	Total recovery.	Cubic yards per man per year.	Recovery, cents per cubic yard.	Operating cost, cents per cubic yard.	Cost per dollar recovered[b] (cents.)
Dredging (United States)	887	65,654,228	7,645,133	74,000	11.4	5.2	45.2
Dredging (including Alaska)	1,024	66,789,343	8,759,917	65,214	13.2	6.3	48.2

[a] Approximated at some mines.
[b] Exclusive of amortization of interest on capital.
[c] Includes silver to the value of $5,003,824.

Electric power consumption (maximum registered) in California: Gold dredging, 15,000 horsepower; lode mines, 9,000 horsepower.

Total labor employed in gold mining in these States estimated 1916, 43,000; 1917, 34,000; 1918, August, 20,000.

TABLE 14.—*Comparative statement showing details of operations at most important gold mines in the United States, grouped by States; dredging operations combined in one group.*

[Compiled by Charles Janin.]

1913.

State.	Tons treated.	Total recovery.	Total operating cost.	Recovery per ton.	Cost per ton.	Cost per dollar recovered.
Oregon	......	......	......	......	......	......
California	697,606	$4,464,755	$2,430,718	$6.31	$3.48	$0.54
Alaska	1,361,604	3,598,334	1,767,295	2.34	1.30	.49
Colorado	741,067	6,544,823	4,207,105	8.83	5.68	.64
South Dakota	1,540,961	6,184,421	4,576,654	4.01	2.97	.74
Nevada[a]	797,228	11,954,534	5,597,082	15.00	7.02	.47
Arizona	151,891	1,825,234	1,172,509	12.00	7.72	.64
Montana	44,726	414,594	247,335	9.27	5.53	.60
Total	5,335,083	34,986,695	19,998,728	6.56	3.75	.57
Total dredging	[b] 51,105,333	5,518,942	2,683,084	[c] 10.6	[c] 5.2	.49

1917.

State.	Tons treated.	Total recovery.	Total operating cost.	Recovery per ton.	Cost per ton.	Cost per dollar recovered.
Oregon	31,893	$311,410	$215,950	$9.76	$6.77	$0.69
California	939,131	6,140,530	4,003,673	6.54	4.26	.65
Alaska	3,153,364	3,724,191	3,375,104	1.18	1.07	.91
Colorado	1,152,714	8,037,218	5,425,392	6.97	4.71	.68
South Dakota	1,677,623	6,609,442	5,016,098	3.94	2.99	.76
Nevada[a]	866,983	8,498,658	5,960,538	9.80	6.88	.70
Arizona	166,204	2,429,872	1,251,178	1.46	7.52	.52
Montana	79,647	939,866	492,300	9.29	6.19	.67
Total	8,067,559	36,691,187	25,740,233	4.54	3.19	.70
Total dredging	[b] 65,654,228	7,645,103	3,459,077	[c] 11.4	[c] 5.2	.45

[a] Recovery given from Nevada mines includes silver value as follows: 1913, $4,828,824; 1917, $5,003,824; 1918, $1,235,000, estimated. Figures for 1918 not given by some mines reporting for previous years.
[b] Cubic yards.
[c] Cents per cubic yard.

Table 14.—*Comparative statement showing details of operations, etc.*—Cont'd.

1918 (SIX MONTHS).

State.	Tons treated.	Total Recovery.	Total operating cost.	Recovery per ton.	Cost per ton.	Cost per dollar recovered.
Oregon	14,785	$145,206	$131,358	$9.82	$8.88	$0.90
California	328,587	3,347,126	2,144,000	10.20	6.52	.64
Alaska	1,304,000	[a] 1,700,000	1,600,000	1.30	1.22	.94
Colorado	616,604	3,367,633	2,449,821	5.46	3.97	.72
South Dakota	827,104	3,300,000	2,572,672	3.99	3.11	.78
Nevada [b]	184,594	2,135,386	1,748,570	11.60	9.47	.82
Arizona	87,130	1,409,147	762,269	16.20	8.74	.54
Montana	36,277	392,574	256,109	10.80	7.06	.65
Total	3,399,081	15,797,072	11,664,799	4.65	3.43	.70
Total dredging	[c] 29,071,604	3,140,733	1,733,542	[d] 11.1	[d] 5.9	.55

[a] Partly estimated.

[b] Recovery given from Nevada mines includes silver value as follows: 1913, $4,828,824; 1917, $5,003,824; 1918, $1,235,000, estimated. Figures for 1918 not given by some mines reporting for previous years.

[c] Cubic yards.

[d] Cents per cubic yard.

In comparison with the figures in the preceding tables the following item [a] published in a mining journal is of interest.

The cost per ounce of producing gold at well-known mines of the world is given as follows:

Alaska Treadwell	$11.85
North Star	11.08
Yuba Dredge	6.26
Camp Bird	7.65
Portland	15.94
Homestake	13.72
Goldfield Consolidated	11.93
East Rand Proprietary	13.41
Mysore (India)	8.39
Sons of Gwalia	14.84
Waihi	12.20
Yukon Gold (Dawson Dredging)	9.76

These figures do not include amortization nor interest on principal, and are not all for the same financial year.

These figures do not cover all items considered by engineers in evaluation, and are none of them for any year later than 1914. It should be fully recognized that these costs of producing gold, as well as others given, are bare operating costs and are not total costs.

The report of the Camp Bird mine for June 30, 1916, shows that from 1902 to that date, 820,730 tons had been treated, with the recovery of £4,778,591 at a cost of £1,798,227, or 37.9 cents for each dollar produced. The report of the Alaska-Treadwell property for December 31, 1916, shows that from the beginning of work until that date, 16,349,663 tons were treated, yielding $39,498,315, at an operating profit of $18,200,338, indicating a cost of 53.6 cents for each dollar of recovery. The report of the North Star group of mines at Grass Valley, Cal., for the year ended December 31, 1917, states that from

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[a] News item, Min. and Sci. Press, vol. 111, Nov. 27, 1915, p. 829.

May, 1884, to that date, 1,757,734 tons had been worked, with the recovery of $20,733,337, and an operating expense of $11,194,270 from an operating and development expense of $13,763,564, indicating an operating cost of 63.6 cents, without development charges, and 66.3 cents, including development charges, for each dollar recovered.

The statement of ore mined on the Witwatersrand previously given shows that from 1887 to 1917, inclusive, more than 340,000,000 tons of ore was treated and more than $2,500,000,000 worth of gold was produced, at an average operating cost of 70 cents on a dollar recovered. Dividends of about 23 cents on the dollar recovered have been paid to shareholders, which would be applied to amortization of capital and as interest on their investment.

From the foregoing it can be seen that, while gold mining at certain favored mines was still a profitable venture in 1917, many of the mines must have been operating at a loss, if consideration had been given to factors aside from operating costs. Costs are rapidly increasing in 1918, and mines which for reasons discussed elsewhere showed a bookkeeping profit in 1917 will operate at a loss in 1918 and 1919.

It must also be remembered in studying the figures of costs given in this report that they have been furnished by the largest producing and most profitable gold mines in the United States, and that these figures do not fully represent the difficulties and handicaps experienced by some of the smaller mines. Some mines have never reached the producing state, having been abandoned because of unfavorable ore conditions and the increasing cost of supplies and labor. The absence of any great profit from gold mining has discouraged the prospector and investor in new ventures in gold mining in recent years.

PROFITS AND COSTS OF MINING.

The incentive for the mining of precious metals is the expectation of profit. Among the conditions requisite for successful operations at gold mines, aside from favorable geological conditions, including sufficient gold content of the ore, is a sufficiency of labor. This is made possible by a scale of wages that will attract men from other industries, or by a large supply of cheap, controlled labor, such as at the Rand. The shortage or high cost of labor has been overcome to some extent in the past by the introduction of machinery and of improved mining and metallurgical methods, making it possible to obtain a large production by the employment of fewer men. Compare the amount of ore treated and gold recovered per man employed by present-day operations, as shown on tables accompanying this report, to those mining operations in ancient days at Nova Carthegena in Spain, where 40,000 slaves were employed and a production of only $5,000 in silver were recovered daily; also compare the amount of gravel handled by the modern gold dredge per man employed to the mining results in early days. Reestablished economic conditions in this country after peace is declared will probably result in renewed activity in mining enterprises. In early days mining was a business conducted by despotic rulers by means of slave and captive labor, but in the course of centuries has become gradually one conducted almost entirely by private individuals or corporations, with voluntary labor that has been adequately paid and generally enjoys more comfort than in many other lines of industry.

Successful mining of such low-grade ores and placers as are now being worked would not have been possible under the crude methods of early days, even with slave labor. It is only in recent years, with improvements in metallurgy in the treatment of low-grade and complex ores, in mining machinery, combined with the ingenuity of the engineer, that such fields as the Transvaal have been made productive.

INCREASED COST OF MINING.

The chief causes of the increased cost of gold mining are as follows:

1. Greatly increased cost of supplies, as shown on comparative lists of prices for 1914 and 1917–18.

2. Increased cost due to small tonnage, caused by (*a*) shortage of labor, (*b*) necessity of mining deposits of different type and narrower or poorer veins, the natural result of continued mining.

3. Rapidly increasing cost of labor due to labor shortage, caused by the induction of men into military service and by voluntary or other transfer of labor to other industries. The cost of labor, which at most lode mines accounts for 50 per cent or more of the direct operating cost, has increased from 25 to 40 per cent. The attraction of the higher wages paid by other classes of mines, by shipbuilding and other war industries, has taken much of the better labor from the gold mines. Men with initiative or having desire for new scenes, as well as for higher wages, have sought other work. Some districts have lost more than 1,000 of their best men in the military draft. The scarcity of labor and the inefficient character of a large part of that remaining available for gold mines, has added greatly to the increased cost. Labor efficiency as compared to the prewar period, is stated to be from 15 to 40 per cent less.

4. The excess-profits tax, although this is felt in comparatively few gold mines. Where there is no profit, there can be no excess-profits tax.

5. Increased freight charges on ore shipments to smelters and on mining supplies and also decreased transportation facilities, as in the Cripple Creek district.

6. Increased cost of coal, gasoline, and electric power.

7. Restrictions imposed on mining enterprises in California by the Débris Commission.

Cost records frequently fail to show the true conditions of operation existing at the mines; hence the casual study of slightly increasing cost figures will not indicate that the mining companies may have been able to continue operations only by practicing rigid economies at the expense of future profit and that operating expenses may have been curtailed by—

(*a*) Cessation of development work and the depletion of reserves.

(*b*) Limitation of work to the richest and most cheaply mined ore bodies.

(*c*) The use of supplies purchased at prewar prices or before prices greatly increased. The increasing cost of supplies has not at most mines affected the operating cost of 1917, to the extent that will be shown in costs for 1918 and 1919.

(*d*) Curtailment of prospecting for new ore bodies and experimenting to improve methods of metallurgical treatment.

All of these forced economies are temporary expedients, but in time the mine management reaches a stage where new supplies must be purchased, new processes installed, and more development undertaken, or the mine closed down to await more favorable conditions of labor, power, and supplies. The closing of some low-grade mines under present conditions may mean that the mine will not be reopened.

The following excerpts from letters to this committee are of interest:

> You will note that our total cost figures do not show any great advance, but our actual advances have been very heavy. This is explained by the fact that during the years 1912–1914 the large ore reserves at this mine were built up at the expense of our total cost, while during the years 1915–16 and part of 1917 they were practically maintained, but in the latter part of 1917 and the whole of 1918 we have been drawing very heavily upon our broken ore reserves until at the present time (about the 1st of July) we have been making about 80 per cent of our production from our reserves. This has been caused from the fact that we are unable to get the necessary labor.

> During 1917 and up to the present time in 1918 (Aug. 17) we have extensively depleted our reserves of ore, particularly those of broken ore, in order to meet, to the best of our ability, the great increase in cost of supplies and labor.

> We are drawing upon reserves which were broken in the several years past, and we are not breaking any ore to take the place of the reserves now being drawn, as it is impossible for us to get sufficient labor.

In order to illustrate the increasing cost of mining operations in recent years, the following cost statements of the Ready Bullion mine, kindly furnished by Mr. F. W. Bradley, are given in detail. Study of mine cost statements for different years without having full knowledge of conditions of operation may give a wrong impression, as the tonnage mined, width of ore bodies, depth of mining, grade of ore, and changes in formation all have direct bearing on operating costs. The data for the Ready Bullion mine show that the cost of supplies and of labor has increased yearly since 1914, but it should also be recognized that sand and rock filling of stopes at this mine has been undertaken during the past two years, and that the cost of contract work has suddenly increased, probably as a result of changing the organization of the work. Also, overhead costs formerly distributed among several mines now borne by one mine on account of operations ceasing at the others. The cost sheets do not show the great scarcity of labor.

TABLE 15.—*Cost data for the Ready Bullion mine, Treadwell, Alaska, for the past five years.*

COMPARATIVE MINING COSTS.

	1913 (222,992 tons milled),		1914 (233,100 tons milled).		1915 (252,154 tons milled).		1916 (286,078 tons milled).		1917 (201,943 tons milled).		Jan.-June, 1918 (67,017 tons milled).	
	Cost.	Per unit.	Cost.	Per unit.	Cost.	Per unit.	Cost.	Per unit.	Cost.	Per unit.	Cost.	Per unit.
Development	$53,562.64	$13.401	$49,197.23	$13.785	$28,301.22	$15.175	$29,950.03	$12.659	$123,656.62	$17.587	$61,451.06	$13.64
Stoping	107,767.62	.703	127,948.85	.513	128,307.36	.734	168,862.93	.447	118,621.37	.937	79,667.06	1.280
Tramming	23,431.59	.105	28,343.58	.122	28,141.22	.112	37,347.69	.131	35,812.95	.177	15,171.42	.226
Hoisting	33,914.08	.152	32,513.00	.139	31,323.53	.124	39,813.20	.139	42,990.13	.213	21,133.47	.314
Pumping	11,488.78	.052	7,921.21	.034	8,455.57	.034	9,616.85	.033	13,788.62	.068	5,309.20	.079
Total	230,194.71	....	245,923.87	....	224,528.90	....	285,590.70	....	334,869.69	....	182,732.21	....
Labor	131,321.31	.588	139,310.59	.598	135,814.08	.538	150,067.94	.525	128,433.25	.636	84,146.86	1.256
Supplies	45,529.87	.209	54,069.55	.232	43,306.87	.172	74,940.84	.262	78,989.55	.391	51,364.93	.766
Subsidiary accounts	52,343.53	.235	52,543.73	.225	45,407.95	.180	60,581.92	.212	127,446.89	.631	47,220.42	.705
Total	230,194.71	1.032	245,923.87	1.055	224,528.90	.890	285,590.70	.999	334,869.69	1.658	182,732.21	2.727

MILLING EXPENSE.

	1913 (222,992 tons milled).		1914 (233,100 tons milled).		1915 (252,154 tons milled).		1916 (286,078 tons milled).		1917 (201,943 tons milled).		Jan.-June, 1918 (67,017 tons milled).	
	Cost.	Per ton.	Cost.	Per ton.	Cost.	Per ton.	Cost.	Per ton.	Cost.	Per ton.	Cost.	Per ton.
Crushing	$7,475.53	$0.034	$3,631.25	$0.016	$5,564.48	$0.022	$7,359.69	$0.026	$8,033.42	$0.040	$3,584.51	$0.054
Tramming	2,627.28	.011	2,828.33	.016	4,890.56	.019	6,330.32	.022	5,952.59	.030	1,566.35	.023
Stamping	35,527.68	.160	38,473.46	.165	45,743.71	.182	64,754.43	.226	48,817.98	.242	12,937.53	.193
Concentrating	13,918.08	.062	15,633.94	.067	17,733.56	.070	19,968.02	.070	16,744.58	.082	6,337.41	.095
Total	59,548.57	.267	61,566.98	.264	73,932.31	.293	98,412.46	.314	79,548.57	.394	24,425.80	.365
Labor	25,297.35	.113	26,072.29	.112	28,457.33	.113	32,677.32	.114	26,461.49	.131	10,939.34	.163
Supplies	12,283.64	.055	10,776.36	.046	18,522.24	.073	19,263.02	.067	10,779.48	.053	1,749.23	.026
Subsidiary accounts	21,967.58	.099	24,718.33	.106	26,952.74	.107	46,472.12	.163	42,307.60	.210	11,737.23	.176
Total	59,548.57	.267	61,566.98	.264	73,932.31	.293	98,412.46	.344	79,548.57	.394	24,425.80	.365

SULPHURET EXPENSE.

	1913 (5,651.67 tons treated).		1914 (5,700.56 tons treated).		1915 (5,621.48 tons treated).		1916 (6,629.77 tons treated).		1917 (5,093 tons treated).		Jan.-June, 1918 (1,761.45 tons treated).	
	Cost.	Per ton.	Cost.	Per ton.	Cost.	Per ton.	Cost.	Per ton.	Cost.	Per ton.	Cost.	Per ton.
Labor	$2,121.00	$0.375	$1,837.00	$0.323	$1,089.00	$0.193	$1,074.00	$0.162	$489.00	$0.096	....	....
Supplies	803.77	.142	844.69	.148	522.27	.093	888.96	.134	813.99	.160	$23.65	$0.013
Train service	805.66	.143	943.60	.166	869.96	.155	1,155.97	.174	792.78	.156	657.22	.373
Sulphuret car expense	90.05	.016	157.54	.027	429.04	.076	291.93	.044	417.82	.082	560.76	.318
Assaying	258.42	.046	195.79	.034	195.16	.035	262.75	.040	350.20	.069	212.31	.122
Cyaniding	17,305.11	3.062	15,720.05	2.758	18,551.79	3.300	27,604.17	4.164	36,150.97	7.098	18,800.24	10.673
D. I. general expense (proportion)	107.31	.019	136.81	.024	127.57	.023	811.71	.122	2,477.87	.486	1,506.73	.855
Liability insurance	....	....	....	....	....	....	29.56	.005	13.44	.003	....	....
San Francisco office	1,956.71	.346	1,908.32	.335	1,844.30	.328	2,480.46	.374	2,770.46	.544	150.84	.086
Total	23,448.03	4.149	21,743.80	3.815	23,629.09	4.203	34,599.54	5.219	44,276.53	8.694	21,911.75	12.440

TOTAL OPERATING EXPENSE.

	1913 (222,992 tons milled).		1914 (233,100 tons milled).		1915 (252,154 tons milled).		1916 (286,078 tons milled).		1917 (201,943 tons milled).		Jan.-June, 1918 (67,017 tons milled).	
	Cost.	Per ton.	Cost.	Per ton.	Cost.	Per ton.	Cost.	Per ton.	Cost.	Per ton.	Cost.	Per ton.
Mining	$230,194.71	$1.032	$245,923.87	$1.055	$224,528.90	$0.890	$285,590.70	$0.998	$334,869.69	$1.658	$182,732.21	$2.727
Milling	59,548.57	.267	61,566.98	.264	73,932.31	.293	98,412.46	.344	79,548.57	.394	24,425.80	.365
Sulphuret expense	23,448.03	.105	21,743.80	.093	23,629.09	.094	34,599.54	.121	44,276.53	.219	21,911.75	.327
Other expense	10,410.76	.047	13,345.69	.058	7,083.55	.028	14,635.37	.051	10,145.21	.051	36,278.71	.541
Total operating expense	323,602.07	1.451	342,580.34	1.470	329,173.85	1.305	433,238.07	1.514	468,840.00	2.322	265,348.47	3.960

INCREASED COST OF SUPPLIES.

The increased cost of the most important materials used in mining is shown in the following tables of supply costs in different districts and for different classes of mining. These costs are representative of all districts.

TABLE 16.—*Comparative statement showing prices of mining supplies in California August 1, 1914, and July 31, 1918.*

Item.	Price, Aug. 1, 1914.	Price, July 31, 1918.	Per cent increase.
Pennington steel shoes....each	$8.60	$12.74	48
Pennington steel dies....do	5.80	7.73	33⅓
Battery screens....per square foot	.90	1.37	52
Nails....per keg	2.35	5.10	117
Danish flint pebbles....per ton	28.00	34.05	21
Steel linings....per 100	3.50	4.50	28
Quicksilver....per flask	51.90	120.00	131
4-inch belting....per foot	.30	.34⅓	14
1⅜ plow-steel cable....do	.38	.55	45
Compressor oil....per gallon	.35	.39	11
Gasoline....do	.15½	.20½	32
Iron and soft steel....per 100	2.00	5.25	162
Sheet steel....do	2.75	6.00	118
Drill steel (Canton extra)....do	7.50	14.50	93
Blasting powder, 40 per cent ammonia gelatin....per 100 pounds	12.25	21.80	78
Blasting fuse....per case	29.40	40.13	37
No. 6X blasting caps....per 100	.75	1.45	93
No. 4 pick eyes....per dozen	4.28	7.50	75
Shovels....do	9.50	13.50	42
Machine drills (B. C. No. 21....each	135.00	175.00	30
Blacksmith coal....per ton	18.50	30.00	62
Carbide....per 100	4.00	6.00	50
Corrugated iron....do	3.70	112.05	226
2-inch black pipe....do	9.12	27.65	206
T rails....per ton	44.00	113.00	157
¾-inch air hose....per foot	.22½	.29½	31

TABLE 17.—*Variation in cost of Tonopah mine and mill supplies.*[a]

Item.	Cost in 1913.	Cost in 1917.	Percentage of increase.
Drill steel, ⅞-inch hexagonal....per pound	$0.1167	$0.2567	120
Blacksmith coal....per ton	19.70	35.00	78
Air hose....per foot	.30	.45	50
Mine shovels....per dozen	7.50	16.50	120
Powder....per pound	.145	.2325	60
Caps....per case	50.00	150.00	200
Fuse....do	27.00	40.00	48
Stulls, 6-inch to 8-inch top....per foot	.10	.10	0
Timber and plank (native)....per M	19.50	32.00	64
Timber and plank (Oregon)....do	24.00	38.00	58
Lubricating oil....per gallon	.25	.28	12
Mine rail, 8-pound....per ton	55.00	110.00	100
Iron pipe, 2-inch....per foot	.12	.25	108
Hoisting cable, 1-inch plow-steel....do	.22	.35	59
Manganese-steel crusher parts....per pound	.145	.203	40
Battery shoes, chrome....do	.06	.085	42
Battery dies, local, cast....do	.035	.04	14
Tube-mill liner, local, cast....do	.053	.06	13
Danish pebbles....per ton	33.00	55.00	67
Sodium cyanide....per pound	.25	.32	28
Sheet zinc....do	.10	.20	100
Lead acetate....do	.09	.165	83
Lime....per ton	17.00	19.00	12
Borax glass....per pound	.136	.16	18
Soda ash....do	.036	.042	17
Crude oil....per gallon	.04	.07	75
Filter canvas....per yard	.56	.70	25

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[a] Carpenter, J. A., Effects of the war on Tonopah mining: Eng. and Min. Jour., vol. 106, Oct. 5, 191, p. 602.

DREDGING.

Table 18 following shows the increased costs of the most important items used in operating gold dredges:

TABLE 18.—*Comparative statement showing increased costs of most important items used in operating gold dredges.*[a]

[Comparison on an annual basis.]

Item.	Unit cost Dec. 31, 1914.	Unit cost July 1, 1918.	Percentage of increase.	Estimated quantity used annually.	Total cost Dec. 31, 1914.	Total cost July 1, 1918.	Increase in cost.
Steel castings:	*Cents per pound.*	*Cents per pound.*		*Tons.*			
100-pound to 250-pound	6	20	233	200	$22,000	$79,600	$57,600
250-pound to 500-pound	5.1	18.5	263				
500-pound to 1,000-pound	4.6	17.5	280				
1,000-pound to 3,000-pound	4.35	16.5	280				
3,000-pound and over	4.10	([b])					
Manganese steel:				*Pounds.*			
Screen liner bars	9.7	23.75	145	102,755	9,970	24,400	14,430
Screen plates	10.80	23.75	120	141,510	15,280	33,610	18,330
Screen obstruction bars	12.15	24.20	100	15,341	1,860	3,712	1,852
Cushion plates	9.14	21.60	137	61,557	5,630	13,300	7,670
Bucket bottoms	9	20.90	132	607,803	54,700	127,030	72,330
Bucket lips	7.86	20.90	166	382,425	30,050	79,926	49,876
Bucket bushings	10.63	23.05	117	47,475	5,050	10,940	5,890
Lower tumblers	10.13	21.85	116	136,310	13,810	29,780	15,970
				Tons.			
Structural steel	[c] 2	[c] 5.15	157	350	14,000	36,100	22,100
Bucket pins	9.25	20.2	118	90½	16,700	36,600	19,900
Cast iron	3.25	6.5	100	105	6,800	13,600	6,800
				Pounds.			
Babbitt	23	50	117	7,000	1,600	3,500	1,900
				Gallons.			
Gasoline	11	18.5	68	50,000	5,500	9,200	3,700
Engine distillate	6.5	10.5	62	25,000	1,600	2,600	1,000
				Pounds.			
Grease (estimated)				[d] 200,000	6,000	9,200	3,200
Wire rope:	*Cents per foot.*	*Cents per foot.*		*Feet.*			
¾-inch	9.4	19.5	108	550	50	110	60
⅞-inch	12.2	25.5	108	7,385	900	1,880	980
1-inch	15.5	32.25	108	33,869	5,250	10,920	5,670
1⅛-inch	19.4	40.5	108	28,283	5,490	11,450	5,960
1¼-inch	23	48.75	108	15,906	3,660	7,760	4,100
1⅜-inch	28.4	59.25	108	6,400	1,820	3,790	1,970
1½-inch	33.5	69.75	108	8,232	2,760	5,740	2,980
Stacker belts:	*Per foot.*	*Per foot.*					
42 inches wide	$8.95	$10.24	14	2,200	19,700	22,500	2,800
36 inches wide	7.20	8.62	20	2,050	14,800	17,700	2,900
Total					264,980	594,948	329,968

[a] Supplied by the Natomas Consolidated Dredging Co. of California.
[b] Special price.
[c] Base.
[d] Actual weight.

The following extract from a letter from a manager of one of the largest dredging companies in the country shows the relation of cost of supplies to operating cost in the dredging industry: "Materials which make up about 40 per cent of our operating costs have increased 128 per cent in price."

The following table shows the increased cost in operations for this dredging company:

TABLE 19.—*Data showing increased dredging costs in cents per cubic yard.*

	1914	Per cent of total.	1917	Per cent of total.	1918[a]	Per cent of total.
Yards worked	25,853,619	....	27,105,967	....	12,898,149	....
Labor	1.09	24.5	1.15	24.9	1.25	23.6
Power	.91	20.5	1.12	24.2	[b] 1.13	21.4
Water	.08	1.8	.08	1.7	.08	1.5
Materials	1.72	38.6	1.59	34.4	[c] 2.03	38.4
General	.65	14.6	.68	14.7	.80	15.1
Total	4.45	100.0	4.62	99.9	5.29	100.0

[a] Six months.
[b] Power costs rose 28½ per cent in August, 1918.
[c] Materials cost for 1919 estimated at 3.9 cents a yard: labor, 1.7 cents.

In 1913 the proportion of the labor costs of four large (Tonopah) companies was 60 per cent for mining and 40 per cent for milling. These costs were divided approximately as follows:[a]

Distribution of costs (1913) for four large gold-mining operations.

	Mining. *Per cent.*	Milling. *Per cent.*
Power	6	16
Labor	64	25
Supplies	30	59
	100	100

These results are of interest because they show that the cost of power is a minor charge, whereas labor is the predominating item in mining and supplies the principal factor in milling. Carpenter states that the Tonapah companies purchase their electric power from a power company, and that the same public service commission power schedules were in operation in 1917 as in 1913, so that the cost of power has not increased.

COMPARATIVE COSTS AT PORPHYRY COPPER MINES.

As an indication of the increased cost of mining metals other than gold the following table of costs at five large porphyry mines is given. The figures represent the total cost per pound of copper, including taxes, but excluding depreciation. Costs shown are from 1915, when the lowest costs in the history of the mines were obtained, to 1917, inclusive. The increased cost of producing copper has been offset by the greater prices, results for the metal differing in that respect to the production of gold.

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[a] Carpenter, J. A., Effects of the war on Tonopah mining: Eng. and Min. Jour., vol. 106, Oct. 5, 1918, p. 603.

Cost of mining copper at porphyry mines.

Mine.	1915	1916	1917
	Per lb.	*Per lb.*	*Per lb.*
Chino	$0.0723	$0.0926	$0.1185
Miami	.0889	.0966	.1262
Utah	.0817	.0884	.1270
Nevada	.1043	.1101	.1418
Inspiration	.0802	.0899	.119
Ray Consolidated	.1015	.1093	.1275
Average	.0874	.0958	.1268

COSTS IN SOUTH AFRICA.

The effect of the increased cost of mining in South Africa is briefly given by E. A. Waller, president of the Transvaal Chamber of Mines, in his presidential address of March 25, 1918, in which he said:

> The preeminent feature of our year's work is that in spite of our conditions we were able almost to maintain the output of gold at about £37,000,000 for the Witwatersrand and £38,000,000 for the whole of the Transvaal, which was a little less than the year 1916.
>
> The increased burden of costs now borne by the industry compared to the prewar period, is £5,000,000 a year, made up as follows:

Increased mine supply	£3,250,000
Increased gold realization charges	400,000
War bonuses and increased wages	600,000
Allowances to employees in active service	350,000
War levies	500,000
Total	5,100,000

The Rand is fortunate in having cheap native labor, and the white labor was highly paid before the war.

THE LABOR SITUATION.

The principal cause for a decreased output in gold mines, aside from natural causes, is the great shortage of labor, although the high prices of supplies and the difficulty of obtaining them are in a measure responsible for the increased cost of operations.

SHORTAGE OF LABOR.

At some mines, where formerly low-grade ore was worked on a small margin of profit, the difficulties as to supplies were perhaps the determining factor in shutting down the mine. Shortage of labor is the inevitable result of taking approximately 9,000,000 men for the purpose of the war. This leaves a gap felt in mining as well as in other industries. In addition to taking 4,000,000 men for the Army and about three and one-half million for the shipbuilding yards and munition plants, etc., there has been coincidently a marked decrease in the number of foreign arrivals in the United States. The alien arrivals for the 12 months ending June 30, 1918, were 211,853, as compared with 362,877 for 1917 and 1,403,681 for the year ending June 30, 1914. Under prewar conditions there was no difficulty in securing sufficient labor for the mines and an employer had the opportunity of selecting men of the better class; at the present time the employer has no choice, but must take any men that are available for employment.

In California, according to Edwin Higgins, engineer for the California Metal Producers' Association, the large gold mines are running with crews from 10 per cent to 40 per cent below normal. For example, the North Star, Plymouth, Bunker Hill, Fremont, Kennedy, Argonaut, and Keystone mines in January, 1915, employed a total of 1,790 men; in January, 1916, 1,924 men; January, 1917, 2,050 men; October, 1918, 1,500 men. The decrease since 1917 is 26 per cent. It should be remembered that the costs increase in greater ratio when the output falls, because a larger part of the expense in mining, as in other industries, is fixed. The cost of drainage, for example, is the same whether there be many or few miners underground. In one mine in another part of the country the output has fallen to 40 per cent of the normal, owing to scarcity of labor, but all the overhead and general expenses remain as large as before. In fact, they are slightly higher.

Labor conditions in the Cripple Creek district, the principal gold-mining district in Colorado, are described by the manager of one of the larger companies as follows:

> In 1916 there were over 3,000 men on the pay rolls. Recently these have been reduced to about 900. Since March, 1918, there has been a steady decline in the miners available until we are now working with about 54 per cent of the minimum number required to keep up production and development, and during the past three months we have drawn as much as 75 per cent of our production from broken ore reserves. Nearly all the capable miners and trammers are on a contract basis, earning $5 and over. Trammers used to average 20 cars a day per man, now on day labor they will not average 10 to 11, while on contract they get as high as 27. Many men are leaving the camp and no new men are coming in. I think this is due to merely the fact that they have the impression that the camp can not run much longer. They say they prefer to go where they can work on the surface while wages are high. We seem to need some psychological as well as material help to keep things going.

LOWER EFFICIENCY OF LABOR AVAILABLE.

Estimates made by producers in answer to questions regarding efficiency of labor rated the decrease in efficiency at 10 to 50 per cent. The following extracts from letters are pertinent in this respect.

> Our labor has become constantly less and less efficient. There is the obvious desire to change, restlessness, dissatisfaction, and readiness to find fault with trifles, and the most deplorable inefficiency.

We find that miners who are capable of operating air tools have gone from the gold mines to copper mines and shipyards, where the larger wage necessarily must attract, and we can not possibly compete with the former industries in the open labor market.

You will readily understand that when the copper mines of Butte are paying $5.75 for miners, we can not get enough men at $4.50, and that such as we get are not of the best.

We reached our maximum tonnage of approximately 9,000 per day in June, 1917. Immediately thereafter the demand for labor throughout the country became so pressing and the increase in wages paid in the copper camps and other lines of industry were so great that we commenced to lose men, particularly good men, rapidly and our tonnage decreased in proportion, so that at present writing we are now down to 3,000 a day. Our development work reached a point where, if the labor had been available, we could easily maintain 10,000 tons per day. We would be compelled to shut down at the present time if it were not for the fact that in preceding years we had broken large tonnages of ore which are now available for milling.

Most mines have almost entirely ceased development work and present figures are not therefore comparable with previous performance. I have seen many estimates by operators, ranging from 20 to 40 per cent. Based on my own field notes in visiting many mines in California, I feel that it is safe to say that the efficiency of labor has decreased at least 25 per cent.

NUMBER OF MEN EMPLOYED IN GOLD MINING.

The number of men employed in 1916 at all classes of metal mines in the United States, according to the best figures available, was 204,685. In addition, about 8,000 men were employed at metallurgical works (not including iron and steel). The following table gives the approximate number of men employed in gold-mining operations in the important gold-producing States during 1916 and 1917. The table, which was compiled from Bureau of Mines figures, also shows what the decrease was in 1917, as compared with 1916:

TABLE 20.—*Approximate number of men employed in mines producing gold in the most important gold-producing States.*

	1916		1917	
	Lode.	Placer.	Lode.	Placer.
California	6,977	2,212	[a]4,800	[a]1,500
Colorado	9,866	123	7,450	99
Nevada	4,995	150	3,950	102
Alaska	2,543	4,924	2,500	4,900
Arizona	3,755	20	2,974	27
Montana	3,745	231	2,795	238
South Dakota	2,348	11	2,064	9
Oregon	737	305	629	232
Total	34,966	7,976	27,162	7,215

[a] Figures by Edwin Higgins.

Approximately 10,650 men were employed in 1917 at those gold mines answering questions submitted by the committee, this being approximately 30 per cent of the total number of men employed in gold mining in the most important gold-producing States. Since the beginning of 1918, as discussed elsewhere, there has been a steady decline in the number of men employed.

WAGES AT GOLD MINES AS COMPARED WITH OTHER MINES.

The following table, prepared by Edwin Higgins, engineer for the California Metal Producers' Association, compares the wages paid in different districts for different years and is of great interest in a study of the labor situation:

TABLE 21.—*Comparative wage scale compiled September, 1918.*[a]

State.	District or company.	Metal.	1913			1914			1915		
			Machinemen.	Hand miners.	Muckers.	Machinemen.	Hand miners.	Muckers.	Machinemen.	Hand miners.	Muckers.
Montana	Butte	Copper	$3.70		$3.70	$3.50		$3.50	$3.83		$3.83
Arizona	Phelps-Dodge Corp., Bisbee	do	4.00		3.75	4.00		3.75	4.10		3.85
Do	Verde district	do	3.75	$3.50	3.00	3.50 to 3.75	$3.25 to 3.50	2.75 to 3.00	3.50 to 4.00	$3.25 to 3.75	2.75 to 3.25
Utah	Utah Copper Co., Bingham	do	3.25	2.75 to 3.00	2.75	3.25	2.75 to 3.00	2.75	3.50	3.00 to 3.25	3.00
Do	General average	do	3.25	3.00 to 3.25	3.00	3.25	3.00 to 3.25	3.00	3.25	3.00 to 3.25	3.00
Nevada	Ely district	do									
California	All districts	do	3.25		2.50	3.25		2.50	3.25		2.50
Washington	General	Copper and gold	3.50	3.50	3.00	3.50	3.50	3.00	3.50	3.50	3.00
Nevada	Tonopah	Silver and gold	4.50	4.50	4.00	4.50	4.50	4.00	4.50	4.50	4.00
Do	Goldfield	Gold	4.00	4.00	3.75	4.00	4.00	3.75	4.00	4.00	3.75
Do	Comstock	Silver and gold	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Montana	Barnes-King Development Co., Kendall	Gold	3.50		3.50	3.50		3.50	3.50		3.50
California	Mother Lode and Grass Valley	do	2.75 to 3.00		2.25 to 2.50	2.75 to 3.00		2.25 to 2.50	2.75 to 3.00		2.50

[a] Compiled by Edwin Higgins.

NOTE.—During 1917 and 1918 bonus and contract systems were generally adopted, base rates being as above.

TABLE 21.—*Comparative wage scale compiled September, 1918*—Continued.

State.	District or company.	Metal.	1916			1917			1918		
			Machine-men.	Hand miners.	Muckers.	Machine-men.	Hand miners.	Muckers.	Machine-men.	Hand miners.	Muckers.
Montana	Butte	Copper	$4.42		$4.42	$5.00		$5.00	$5.25 to 5.75		$5.25 to 5.75
Arizona	Phelps-Dodge Corp., Bisbee	do	5.32		5.07	5.60		5.35	5.50		5.25
Do	Verde district	do	4.00 to 5.00	$3.75 to 4.50	3.25 to 4.25	5.00 to 5.50	$4.25 to 5.50	4.25 to 5.50	5.15 to 5.90	$5.15 to 5.90	5.15 to 5.90
Utah	Utah Copper Co., Bingham	do	3.75 to 4.25	3.25 to 3.75	3.25 to 3.75	4.50	4.00 to 4.25	4.00	4.75 to 5.25	4.50 to 5.00	4.25 to 4.75
Do	General average	do	3.25 to 3.75	3.00 to 3.75	3.00 to 3.50	4.50	4.25	4.00	4.75 to 5.25	5.00	4.75
Nevada	Ely district	do				5.25			5.75		
California	All districts	do	3.25 to 3.75	3.00 to 3.25	2.50 to 3.00	3.75 to 4.00		3.50	4.00 to 4.50	3.75 to 4.25	3.50 to 4.00
Washington	General	Copper and gold	3.50	3.50	3.00	4.00	4.00	3.50	5.00	5.00	4.50
Nevada	Tonopah	Silver and gold	4.50	4.50	4.00	5.00	5.00	4.50	5.50	5.50	5.00
Do	Goldfield	Gold	4.00	4.00	3.75	4.00	4.00	3.75	4.00	4.00	3.75
Do	Comstock	Silver and gold	4.00	4.00	4.00	4.00	4.00	4.00	5.00	5.00	5.00
Montana	Barnes-King Development Co., Kendall.	Gold	3.50		3.50	3.50 to 4.00		3.50 to 4.00	4.00 to 4.50		4.00 to 4.50
California	Mother Lode and Grass Valley	do	3.00 to 3.25		2.50 to 2.75	3.25 to 3.50		2.75 to 3.00	3.50 to 4.00		3.00 to 3.50

LABOR CONDITIONS ABROAD.

The labor situation is being seriously studied in other countries. The following note regarding increased wages on the Rand is of special interest, as is also the discussion of conditions in Canada and the remedy proposed, which deserves serious attention:

> Last month we recorded that the white workers on the Rand have asked for a big increase in wages owing to the continued advance in the cost of living, and that the Chamber of Mines had appealed to them to moderate their demands. Since then the men have appreciated the fact that any substantial rise in wages would mean the closing of 17 of the low-grade mines that are now hovering on the border line of loss. The Chamber of Mines has undertaken to revise the scale of wages wherever increased costs of commodities is proved, and to finance the purchase of supplies on a cooperative basis.[a]

CONDITIONS IN CANADA.

Conditions in Canada[b] are discussed in the following authoritative paragraphs:

> To get at the root of the matter, the gold standard can only be upheld, the gold reserves can only be maintained effectively and naturally by getting at and removing the cause of the existing disturbance of values. This means the restoring of the equilibrium between supply and demand. The equilibrium can only be restored by enormously increasing the production of commodities until supply again balances demand. Such an accomplishment is impossible either in the United States or Canada with the available labor at this time. The problem resolves itself into one of labor; the solution lies in being able to secure the labor. Apparently there is one source that can be drawn upon. There is practically an inexhaustible supply of labor in China. The Chinese are our allies. They are desirous of helping us to defeat Germany, and that help could not take a more convenient and more useful form than the provision of armies of workers to relieve us of the handicap of economic and industrial stress in the prosecution of the war. Already Chinese in numbers are tilling the fields behind the trenches in France. Let this be the precedent. Why could not we in Canada and the United States ask for similar assistance? Why could we not invite China to marshal and dispatch a great army of efficient farm, mine, and forest laborers under military supervision and military pay to aid us in speeding up that production on which the winning of the war so considerably depends? There is only one thing to interfere; unhappily, it may prove an insuperable obstacle. The objection of organized labor must probably be anticipated. Organized labor in Canada represents less than 3 per cent of the population of the country, but even in war time its views carry quite disproportionate weight with those to whom the destinies of the country are intrusted. It is a factor that can not be ignored; but, after all, both among the leaders and rank and file of organized labor are as many men of patriotic and right feeling as in other classes. It should not be difficult to overcome such prejudice as they may entertain to a proposal of this kind,

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[a] Editorial, Review of Mining: Mining Mag., London, vol. 19, September, 1918, p. 120.

[b] Editorial, Labor and the purchasing power of gold: Bull. Canadian Min. Inst., August, 1918, pp. 672–673.

especially when proof is adduced that their class as a whole, instead of harm, will derive direct benefit, and when they receive guarantees to safeguard their interest and position. Only the other day the secretary of one of the most powerful local unions in the West stated in an interview that the miners were far more comfortably circumstanced before the war when drawing an average wage of $4 a day than they are to-day with earnings of over twice that amount, but with the cost of living so greatly advanced. The statement is probably approximately correct. One aim, therefore, should be to reduce the cost of living for all. By the full utilization of our raw materials and resources production, at present not sufficient for the demand, can be increased until it is sufficient and the commodity value of gold will be, in consequence, restored to its former level. This, however, can only be attained if labor can be made available to the required extent. Undoubtedly our urgent need in this respect, and particularly as regards agricultural labor, can be supplied by China. To ignore such a recourse for any reason of class selfishness, prejudice, or ignoble sentiment would surely be unpardonable.

EXPERIMENT IN THE RAND.

In 1904, soon after the Boer War, there was a decided shortage of labor in the Transvaal. To help out the situation and reopen all the mines recourse was had to recruiting labor from China. Chinese coolies were brought to the Transvaal under strict indenture, which bound them to return after 3 years, during which time they were not to be employed in any class of skilled labor. They were without families and were fed and housed at the expense of the mining companies, and were not allowed to leave without permission the mining properties where they were employed or to engage in any other occupation. This experiment was an unqualified success, having the effect only of supplementing the native labor and increasing its efficiency, enabling the mines to be worked at full capacity, thus giving more employment to white labor. The white labor of the Rand was far more in sympathy with this experiment than the liberal party in Great Britain. All of the Chinamen were returned to China at the expiration of the 3 years.

SUGGESTED METHODS OF RELIEVING LABOR SHORTAGE AT GOLD MINES IN THE UNITED STATES.

In the United States it has also been suggested that the Government employ large numbers of Chinese for agricultural and mining labor and permit the importation of a larger number of Mexican laborers than are now available and allow the employment of those men in the gold-mining States. It is now permissible under certain regulations to import Mexican labor into the border States. This means of relief may well be extended. Other suggestions have been the employment of selected convict labor properly paid and cared for.

Aside from consideration of these proposals the assistance of the Government can be properly given by permitting the return of drafted men in larger numbers on furlough to work at gold mines or detailing sufficient numbers of the men from selected draft reserves for the same work. This is further discussed in measures of relief asked for the gold-mining industry.

METHODS OF INCREASING THE GOLD RESERVE.

Aside from stimulating or maintaining the production of gold from gold-mining operations, the reserve stock of gold held by the United States Treasury or Federal Reserve banks in the United States might be greatly increased by:

1. Curtailing the use of gold in manufacturing.

2. Making a patriotic call upon the public to turn in their hoarded gold. In this way large amounts of gold can be added to the reserve in stock already held in this country. The following quotations from the report of the Bank of France for last year is pertinent in this regard:

> Holders of gold continue to bring us their reserves with the most laudable patriotism. Thanks to the valuable assistance which has never failed us and to the wide activity of the committee on gold, which is to the number of 150, radiating throughout the whole of France, we have had the satisfaction of recording in 1917 288 millions of francs in new payments or a weekly average of 5½ millions. Since the outbreak of the war the amounts brought voluntarily by the public have reached 2 billions 277 million.

In the United States there is a large amount of gold in the possession of State banks and trust companies and State, county, and municipal treasuries which can be brought into the Federal Reserve banks by changing the laws of some of the States. Resolutions regarding the transferring of gold reserve from State to Federal Reserve banks were passed by the American Bankers' Association, Chicago, September 27. Table 22 following shows the estimated stock of money in the United States September 1, 1918.

TABLE 22.—*Estimated general stock of money, money held by the Treasury and by the Federal Reserve system, and all other money in the United States Sept. 1, 1918.*[a]

	General stock of money in the United States.	Held in the United States Treasury as assets of the Government.[b]	Held by or for Federal Reserve banks and agents.	Held outside the United States Treasury and Federal Reserve system.	Amount per capita outside the United States Treasury and the Federal Reserve system.
Gold coin [c]	$3,079,300,229	$261,241,260	$1,421,604,718	$436,729,562	....
Gold certificates	....	....	483,171,590	476,553,099	....
Standard silver dollars	460,253,959	34,242,617	....	79,480,196	....
Silver certificates	....	....	7,050,082	337,646,831	....
Subsidiary silver	231,874,845	10,592,279	[d] 762,814	220,519,752	....
Treasury notes of 1890	....	....	....	1,834,233	....
United States notes	346,681,016	6,286,424	[e] 45,174,282	295,220,310	....
Federal reserve notes	2,225,838,710	34,502,755	100,530,120	2,090,805,835	....
Federal reserve bank notes	24,687,960	247,635	3,349,492	21,090,833	....
National-bank notes	724,318,652	22,824,090	8,728,705	692,765,857	....
Total:					
Sept. 1, 1918	7,092,955,371	369,937,060	2,070,371,803	4,652,646,508	$43.83
Aug. 1, 1918	6,895,089,799	390,798,058	2,054,455,993	4,449,835,748	41.97
July 1, 1918	6,742,225,784	356,124,750	2,018,361,825	4,367,739,209	41.31
June 1, 1918	6,615,007,782	348,322,704	1,983,796,097	4,282,888,981	40.51
May 1, 1918	6,540,954,630	321,192,308	1,909,594,674	4,310,167,648	40.82
Apr. 1, 1918	6,480,181,525	339,856,674	1,873,524,132	4,266,800,719	40.47
Mar. 1, 1918	6,351,548,056	330,927,176	1,827,126,208	4,193,494,672	39.83
Feb. 1, 1918	6,271,603,039	332,576,125	1,834,102,608	4,104,924,306	39.04
Jan. 1, 1918	6,256,198,271	277,043,358	1,723,570,291	4,255,584,622	40.53
Dec. 1, 1917	6,026,127,909	248,167,148	1,646,773,746	4,131,187,015	39.40
Nov. 1, 1917	5,823,854,335	242,265,377	1,546,124,691	4,035,464,267	38.54
Oct. 1, 1917	5,642,264,856	242,469,027	1,429,422,432	3,970,373,397	37.97
Sept. 1, 1917	5,553,661,154	239,654,267	1,373,987,061	3,940,019,826	37.73
Aug. 1, 1917	5,513,292,894	248,268,325	1,395,982,728	3,869,041,841	37.10
July 1, 1917	5,480,009,884	253,671,614	1,280,880,714	3,945,457,556	37.88

[a] Federal Reserve Bulletin, Oct. 1, 1918, p. 1042.

[b] Includes reserve funds against issues of United States notes and Treasury notes of 1890 and redemption funds held against issues of national-bank notes, Federal Reserve notes, and Federal Reserve bank notes.

[c] Includes balances in gold settlement fund standing to the credit of the Federal Reserve banks and agents.

[d] Includes standard silver dollars.

[e] Includes Treasury notes of 1890.

From this it is clear that a large amount of gold can still be added to the currency reserve, regardless of what may happen to gold mining.

It seems that the peak of gold production was finally reached in 1915 and the high level 10 years ago, and it is hardly likely that the figure for 1915 will ever be surpassed. The decrease in gold production is largely due to normal causes. Gold dredging, which was responsible for an increase in production of gold in the United States and has tended to revive a declining industry, has also reached or passed its zenith. The richest placer areas have been exhausted. The well-known lode mines are working lower-grade ore yearly, and many of the known ore bodies are fast approaching exhaustion. No new rich gold fields are known to exist, but investigation will undoubtedly be made of Siberia and South American countries when economic conditions reach a more normal prewar level, and these areas offer some promise. The production of gold in Mexico will increase when economic conditions in that country improve.

The opportunity for increasing the recovery from complex ores by improved metallurgical methods are not as promising as they were a few years past, when the gold and silver losses in the tailings were much higher than at the present time. Operating methods can still be improved and costs lowered, but the increasing cost of labor and supplies tends to offset the benefit resulting from any improvment in this line.

RELIEF ASKED FOR THE GOLD-MINING INDUSTRY.

RESOLUTIONS OF CONFERENCE AT RENO, NEV.

The American Gold Conference assembled at Reno, Nev., August 12, composed of representatives from the gold-producing States. Gov. Emmet D. Boyle presided. The sessions of the conference lasted three days. A number of committees composed of prominent men identified with the gold-mining industry were appointed for further work on the subject, and an executive committee to bring the facts regarding gold mining to the attention of the authorities at Washington. This committee was constituted as follows: Emmet D. Boyle, W. J. Loring, Bulkeley Wells, Whitman Symmes, and George W. Starr.

Resolutions passed at the conference are given here in full as being what, in the opinion of the conference, was the only practical method for the relief of the industry:

Whereas gold production in the United States has declined from $101,000,000 in 1915 to $84,000,000 in 1917, with a still greater decrease now taking place, the production of California alone having declined $3,000,000 in the first six months of the present year; and

Whereas this decrease is principally due to the increased cost and shortage of labor and material, the price of gold, as our standard of value, being fixed by law at the invariable figure of $20.6718 per ounce, thus being the only important product which has not obtained an increased market price due to the present war conditions; and

Whereas under present conditions capital can not be obtained for gold mining, but is generally being withdrawn wherever possible from the said industry; and

Whereas on account of the increased cost of production, with no increase at all in the market price of their product, many mines have been forced to cease operations in the last six months, many others are now running at a loss and are about to be closed down or abandoned, and from their nature will require years to be reopened, so that a large portion of the gold-mining industry is now threatened with extinction; and

Whereas a war emergency exists which, we are advised by our own Government, necessitates the maintenance, and, if possible, the increase, of gold production of the United States as of the next importance after food and war munitions, being of vital importance as a basis for our continually expanding credits, which are necessary both for the financing of the war and for reconstruction after the war; and

Whereas the gold reserves of the United States are adequate to maintain our former production and to afford under proper encouragement a substantially increased production; now, therefore, be it

Resolved, That it is the sense of this meeting that of all the various measures which have been suggested, the following will be the most effective in maintaining and encouraging the production of gold in the United States, namely:

Relief by the United States to the gold producers of this country to correspond with the increased cost of production, the extent of such relief to be fixed from time to time to meet the changing conditions;

That nothing in these resolutions as passed is to be construed as meaning an intention to alter the amount of gold in the dollar nor to place a premium upon gold.

RELIEF MEASURES PROPOSED BY GOLD-MINING INDUSTRY IN RESPONSES TO QUESTIONNAIRE.

The following nine items cover briefly the different measures of relief asked for by the gold-mining industry in response to the questionnaire sent out by the committee:

1. Payment by the Government of a bonus on all the newly mined gold. This was qualified by some of the operators who asked that it apply only to primary gold mines; that is, to gold produced at mines where gold is the principal metal and not a by-product. The amount of bonus advocated ranges from $10 to $20 an ounce, $10 being the amount nearly always suggested.
2. Exemption from draft of necessary employees and the placing of labor for gold mines in the deferred class.
3. The assistance of the United States Employment Service in securing and maintaining a sufficient supply of labor.
4. Furnishing of supplies to gold mines by the Government at prices more nearly in keeping with prewar figures.
5. The abolishment of excess-profits tax; to this some added the demand that a larger allowance for depletion for ore extracted should be permitted by Treasury officials in computing tax charges on profits.
6. Preferred classification for railroad freight, a reduction of the advance in freight charges for supplies to gold mines and on ore shipments.
7. In California the activities of the débris commission are said to cause hardships at some mines.
8. Preferred classification for electric power.
9. Allowance of free export and sale to industry of new gold.

DISCUSSION OF PROPOSED RELIEF MEASURES.

Gold miners believe that their industry is entitled to consideration of Government aid more than any other industry that may have suffered financially through conditions brought about by the war, because other industries can and do raise the prices of their goods while the purchasing power of gold is proportionately decreased. They urge that it is vital from an economic standpoint that the gold reserve be increased and the production of gold be maintained at approximately normal prewar figures, or be stimulated beyond such amounts. If these premises be accepted, then it is necessary to find what measures can be best taken in order to accomplish these ends and to maintain as large a production of gold as is justifiable on economic grounds.

In studying this subject attention should be directed to the various tables showing the relation to the world's production of that of the United States, and also to the discussion of the need of gold.

BONUS.

Payment by the Government of a bonus on all newly mined gold, in order to stimulate the production of gold, has been strongly advocated by some miners and has been approved by some bankers. The amount suggested as allowable for this purpose as agreed upon at different conferences held by the representatives of the gold-mining industry, is $10 per ounce. To what extent a bonus of $10 per ounce would increase the production of gold is questionable, but naturally a bonus would have a stimulating effect on the industry; it would cause renewed activity at operating mines, the reopening of a number of mines that have recently closed, and would encourage the search for new mines, unless some restrictions were put in force. By way of qualifications, it has been suggested that the bonus apply:

1. Only a those mines at which gold is the principal metal produced.

2. Only to mines at present operating or which were operating up to the war period and were obliged to close on account of increasing costs.

3. Only on the amount of gold produced at a mine in excess of the 1917 production.

4. That the bonus apply only during the war period and cease soon after the war ends.[a]

The following also is of interest in this connection:

> To stimulate the gold industry it would seem that the most practical relief to the producer would be for the Government to pay a fixed sum for every ounce of new gold sold to the mint in addition to the price of $20.6718, at which liquidations are now made. While I can not speak from the viewpoint of a mining man, I have received convincing statements from reliable sources which leads me to believe that such relief during the war, and perhaps prolonged for a year or two after peace, would be the best and most effective plan for maintaining and encouraging the production of gold in this country.[b]

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[a] Speech at meeting at Spokane Sept. 15 by George Greenwood, Old National Bank.

[b] John Clausen, vice president Crocker National Bank, San Francisco.

It is obvious that with the restrictions mentioned, the granting of a bonus would not greatly increase the production of gold for the next two or three years over the amount produced for the year 1917. On the assumption that the production of 1917 might be maintained for a few years by granting a bonus for new gold produced, it becomes desirable to determine the level to which the production of gold would fall without such a bonus. With the adjustment of economic conditions after peace is declared and the return to industry of soldiers and of laborers engaged in war work, it is to be expected that the shortage of labor will be at least partly relieved. Wages may be expected to fall, but prices of supplies will probably continue at high level for some time, or until industry is readjusted to nearly normal conditions. With the return of conditions comparable with those of the prewar period, the present difficulties of the gold-mining industry may disappear.

If scarcity of labor, high wages, and high costs of materials should continue for two years, the annual production of gold in the United States may fall to $60,000,000 or less. On the assumption that a difference of $25,000,000 in the gold production would result from the payment of a bonus by the Government on new gold produced and that a bonus of $10 per ounce, or approximately 50 per cent, of the present value of gold would need to be paid for all gold produced in order to obtain an increased output of $25,000,000, it is apparent that the cost of securing this $25,000,000 would be the normal cost of $25,000,000 plus a bonus, or approximately $42,500,000 extra on the total annual production of $85,000,000. The suggestion that a bonus apply only to the amount of gold produced at a mine in excess of the production of that mine for 1917 would give preferential treatment to a few well-known mines and would be of little benefit to the majority of gold mines in the United States. Sound business judgment would be against the bonus at this time.

In connection with the suggested bonus on gold it is interesting to note that the matter has had recent attention in South Africa and Australia and is now under discussion in England. The South African and Australian Governments ruled against the payment of a bonus on gold.

In October, 1918, the British Treasury appointed a strong commission representative of the leading financial interests of the Empire to investigate into the effects of the war on gold production in the British Empire. The personnel of this commission includes Lord Inchcape (chairman), Sir Thomas Elliott, Sir Charles Addis, and W. H. Goshen: William Frechville, mining engineer, advises on technical mining problems. This commission is making a sweeping inquiry into the conditions at gold mines and possible measures of relief. Especial attention is being given the desirability of granting the demands of the gold producers for a revision of the selling price of their product to compensate for the increase in cost of labor and supplies, to means of encouraging the mining of low-grade ores, and of stimulating the production of gold in general.

The producers of South Africa and Australia have requested the treasury to contract for all gold mined by them for a term of 10 years at a price calculated to insure maximum production. The seriousness of the situation in those countries is reflected in a statement by E. A. Waller, chairman of the Transvaal Chamber of Mines, to the effect that out of 46 companies operating in the Transvaal 6 were running at a loss and 15 were barely paying expenses. Confirmation of this statement is given by Sir Lionel Phillips, who says, according to an article published in September, 1918, that a large number of the mines on the Rand will have to shut down unless some relief can be obtained.

EXEMPTION FROM MILITARY SERVICE.

The exemption from draft of necessary employees and the placing of labor for gold mines in the deferred class has been granted, to a certain extent, by recent rulings of the War Department; gold mining has been declared an essential industry, and the matter is one for local draft boards to decide whether individual men are necessary to the industry.

ASSISTANCE OF UNITED STATES EMPLOYMENT SERVICE.

The assistance of the United States Employment Service in securing and maintaining a sufficient labor supply is asked. The United States Employment Service can, if authorized by proper Government action, assist the gold miners in the returning to the mines of experienced men who have gone into other war industries for patriotic or other reasons. It can also transfer men now employed in less essential industries. Some advertising could properly be undertaken by the gold mines to impress upon labor that gold mining is regarded as an essential war industry and that men necessary to that industry are subject to deferred classification by the local draft boards. The Director of the Bureau of Mines, as certifying officer to the War Department on industrial furloughs for metal mining and metallurgical industries, can aid greatly in the rehabilitation of the labor supply of the gold mines. Negotiations are now under way whereby men returned from France for recuperation may be used to some extent in industry where their health would be benefited during the period of their recuperation; this would release more able-bodied men for the more arduous tasks, such as mining.

Allotment of labor to mines must be guided by intimate knowledge of the gold mines requesting assistance; otherwise labor might be wasted on unimportant projects. Because of this fact and the fact that wages are higher in some other industries, and on account of the isolated location of many of the gold mines, it is difficult for the United States Employment Service to recruit labor for gold mines. Relief through the War Department would not be hampered by these objections, since no man is to be furloughed unless willing. The men would be properly cared for and paid a wage fixed by the Government. It is the opinion of this committee that the labor situation is the most serious problem confronting the gold miner, and that this should be given consideration by the proper Government agency. It is only through Government action as above outlined or through the importation of laborers, as discussed elsewhere, that the labor situation during the war and the readjustment period after the war can be greatly improved.

FURNISHING SUPPLIES AT SPECIAL RATES TO GOLD MINERS.

Furnishing supplies to gold miners by the Government at prices more nearly comparable with prewar figures than now paid would cause great dissatisfaction at mines producing other metals and in other important industries, and it is not considered feasible. A central purchasing agency for buying supplies would give some relief to the small miner, as suggested elsewhere.

ABOLISHMENT OF TAXES.

Excess profits were imposed at few gold mines in 1917. The total amount paid as reported by mines answering questionnaires was under $500,000, though some disputes for additional amounts are still unsettled between companies and tax officials. Proper allowances should be given mines for depreciation of plant and depletion of ore by tax officials; much remains to be done to educate tax officials to appreciation of the proper rate of such allowances. Should a small group of miners or prospectors form a small company of, say, $10,000 to $100,000 capital, and expend the entire capital but strike it rich and take out as net profit an amount equal or more than the capital put in, in such case they would be obliged to turn over to the Government nearly half of their profits. Under such conditions the search for new gold discovery is greatly discouraged by the tax. The elimination of all excess-profits taxes on gold mining and the encouraging of maximum outputs might in reality bring in greater revenue to the Government than the tax; for larger dividends paid to shareholders would mean greater revenue from individuals.

PREFERRED CLASSIFICATION FOR FREIGHT.

Gold mining has been declared an essential industry and given a class C rating. As such it is entitled to receive priority orders for freight, etc. The reduction of freight charges on ore shipments where there has been a recent advance, as in Colorado, is a measure that should be allowed. The cost of freight on shipments of materials to gold mines is but a small part in the total cost of mining.

DÉBRIS COMMISSION (CALIFORNIA).

This applies to California only. The committee has received many general statements to the effect that the commission has been especially active and that their orders for expensive construction is causing great hardship at some of the lode mines at this time, when costs are high and profits from gold mining are abnormally low.

PREFERRED CLASSIFICATION FOR ELECTRIC POWER.

In California there was a shortage of power, caused by lack of mains, and the action of the State power administration in discriminating against gold dredging caused general dissatisfaction. It was rightly felt that other forms of power consumption, such as amusements, unnecessary lighting, etc., could be curtailed with far less loss to industry. The gold mines should have a high-class rating with regard to power consumption and power should be withheld only when there is actual necessity for such action.

FREE EXPORT AND SALE OF GOLD.

Gold has been sold in England at 115s. per ounce, as against 85s. per ounce paid by the Bank of England for coinage purposes, and the Government found it necessary to prohibit the melting of coins. Gold under present conditions could be also sold at a premium in this country for use in industrial arts, and if a free sale of gold were now permitted a certain amount could be absorbed at a considerable premium. A study of the table on page 33 shows that for the last four years about forty-five million a year, approximately one-half of the amount produced in the United States, went into the manufactures. Dentists use a large part of this gold, and could pay a higher price for it, as could also jewelers. The amount of old material—jewelry, etc.—consumed in manufactures in the United States has been approximately $8,000,000 worth a year, and of new gold, approximately $37,000,000 a year.[a] The annual amount that could be absorbed at a premium is not known, and would depend to some extent upon psychological conditions. If it were thought that the price of gold would go higher, quantities would be bought for speculative purposes unless restrictions were imposed. The following is of interest in regard to the sale of gold in the open market:

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[a] See Report of the Director of the Mint, 1917, p. 64.

> It seems to have been overlooked by many that the mint price for gold (85 shillings, or $20.67) is quite different from the market value or exchange value of the metal. Gold as a commodity has had, this last month in England, a value some 35 per cent in excess of the mint price. The Annalist tells us that minted coins have been at a high premium because of profiteering by labor. Workers are receiving wages higher than ever before in their experience and there is a demand for jewelry which exhausts the supply of gold, the commodity. An ounce of gold in a jeweler's hands will make four rings, for which he will get at least $30; in consequence, the market price of gold in those countries in which gold has been commandeered is nearly 50 per cent above the mint price. This is the fact that has led Sir Lionel Phillips and his committee to approach the British Government for permission to sell the gold produced by their mines in the "open market"; that is, sell it as a commodity.[a]

FURTHER SUGGESTIONS BY COMMITTEE.

In addition to the matter discussed above it is the opinion of this committee that gold should be placed under authority of the War Minerals Administrator. In that way Government assistance can be given gold mines where desirable as provided for in the war-minerals bill for the other important metals included therein.

It is also suggested that a thorough study be made of the gold-mining industry with a view to improving mining and metallurgical conditions and also to go thoroughly into the labor situation.

It seems feasible for the Government, through the Bureau of Mines, to assist in improving methods of mining and metallurgy, particularly the latter, in the treatment of complex ores and those of low-gold content. A number of technical problems requiring solution may be mentioned. Among these are the regeneration of cyanide solution, the treatment of complex and refractory ores, the cheaper production of cyanide, and the recovery of by-products from tailings. The practical solution of a few of these problems might easily bridge the gap between failure and success in the operation of low-grade properties. That particular field of work has been almost untouched by the Government and the present action may be particularly opportune for planning adequate work in that field.

Efforts should also be made to extend cooperative buying of supplies by mining companies. A central agency could be established in each State or district for cooperating with those elsewhere and thus reduce costs. This would insure not only the best prices but the greatest consideration from firms dealing in mining supplies. It would naturally prove more beneficial to the smaller mines that do not maintain purchasing departments, but would to some extent insure the larger mines better prices than they now obtain.

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[a] Editorial: The gold industry after the war: Bull. Canadian Min. Inst., October, 1918, pp. 860–861.

In addition great benefits would result from the distribution of knowledge, based on the experience of the largest users, as to the most satisfactory material to use for different kinds of work. Information of this kind could be properly discussed in a report on the gold mining industry by the Bureau of Mines.

.CONCLUSION.

There is no doubt that the output of the gold mines of the United States is seriously falling off, and under present economic conditions still smaller returns must be looked for in the future. The cause of the decrease is not wholly due to war conditions, but also to the fact that some of the most productive lode and placer mining deposits are showing exhaustion while no equivalent deposits to take their places are being discovered.

War conditions bear with special weight on the gold-mining industry, in that as the prices of other commodities advance the purchasing power of gold necessarily decreases. The prohibition of exports of gold and the limitation of the circulation and internal trade in gold are injurious to the gold miner and justly entitle him to special consideration.

The different aids that have been suggested have been outlined. The granting of a bonus, or bounty, has the greatest advocacy from the mine operators, but seemingly such a measure would net the Government only a very small increase to its present great gold reserve, and that at great cost. The principle of the bonus appears to be in general economically unsound and its application might result in serious abuses.

As a result of the war the United States has changed from a debtor nation into the great creditor nation of the world, and has the largest gold reserve and best gold cover for its paper currency. Its credit, while undoubtedly the soundest, is still probably in need of gold backing for the reconstruction period, if this country is to make use of its advantage as a world power in trade. It must be remembered that we control only about one-fifth of the current output of the gold mines of the world, and peace conditions may not prove so favorable for our holding our premiership as a creditor nation. The liberty loan bonds, with pledges for redemption in gold, may amount to several times the total gold reserves of the world, and some provision must be made from time to time to pay at least a portion of them in gold as they fall due.

The various measures of relief asked for by the gold-mining industry, with the exception of Nos. 1, 4, and 6, could easily be granted by Executive action without additional legislation. As the profits of a gold mine, no matter how large, can not be ascribed to war conditions, and, in fact, are seriously reduced by such conditions, the remission of this tax is a logical and just demand and might well be considered. The free export and sale of new gold should be permitted not only because it will help the miner, but also because it gives freedom of movement, thus preventing inflation.

Intelligent relief might be extended where it is most needed by amending the war-minerals bill to include gold and at the same time voting an appropriation that would be at the disposal of the administrator to encourage gold discovery and to aid in the reopening of mines shut down on account of adverse economic conditions. This we have pleasure in recommending.

The thanks of the committee are hereby extended to the officials of the various gold-mining companies who have so courteously and generously supplied information in response to the questionnaire of the committee, and to the eminent political economists and bankers whose frank and hearty responses to requests for an expression of views have been most helpful and have been received with sincere appreciation.

Respectfully submitted.

Hennen Jennings, *Chairman.*
J. H. Mackenzie.
F. L. Ransome.
H. D. McCaskey.
Charles Janin, *Secretary.*

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INDEX.

A.

Page.

Alaska gold mines, production of — 44
Alaska, gold production in — 43–44
Alaska-Treadwell mine, operating costs of — 47
  See also Cost of production.
American Bankers' Association on importance of gold production — 24
  See also Gold, purchasing power of, decrease of; Gold, universal unit of labor; Production of gold, decline of.
American Gold Conference, 1918, executive committee, personnel of — 67
  relief methods suggested by — 68
  See also Labor allotment to mines of; Labor shortage, relief by Chinese labor of; Mexican labor, importation of.
  resolutions of — 67
Argentina, gold reserve of — 27
Arizona, gold production in — 40
Australia, gold production of — 22
Austria-Hungary, Bank of, securities of — 26
  gold reserve of — 27
  national debt of — 26
  national wealth of — 26

B.

Bank clearings, United States, 1900–1917 — 31
  deposits, United States, 1800–1917, diagram showing — 14
    1900–1917 — 31
Banks of issue, assets of — 28–29
  liabilities of — 28–29
  securities of — 25–26
Bonus on mined gold, advantages of — 69
  disadvantages of — 70, 79
  foreign action regarding — 70
Bureau of Mines, suggestions from — 74

C.

California, gold production in — 44
Camp Bird mine, operating costs of — 47
Canada, gold production of — 22
Chinese labor, importation of, advantages of — 63–64

Chinese labor—Continued.
  See also Mexican labor, importation of.

Page.

  use of, in France — 63
    in the Transvaal — 64
Coal, London price of, 1800–1917, diagram of — 13
  United States output, 1800–1917, diagram of — 14
    price of, 1800–1917, diagram of — 14
  world's output of, diagram of — 13
Colorado, gold production in — 43
Commission on gold, British personnel of — 79
Committee on gold situation, Department of Interior, personnel of — 11
Consumption of gold in United States, 1900–1918 — 33
  diagram of — 34
Cooper, H. E., on expansion of credit — 25–26
Copper, increased cost of mining — 56–57
  London price of, 1800–1917, diagram of — 13
  United States, output of, 1800–1917, diagram of — 14
    price of, 1800–1917, diagram of — 14
  world's output of, diagram of — 13
Cost data, Ready Bullion mine, Alaska — 52–53
  Alaska-Treadwell mine — 47
  Camp Bird mine — 47
  Witwatersrand fields — 22–43
Cost of production, distribution of — 56
  increase of, causes of — 49–50
  See also Supplies, increased cost of; Wages, increase of, in factories during the war, diagram of.
    in South Africa — 57
    at porphyry copper mines — 56–57
  1913, 1917, 1918, by States — 46–47
  per dollar, United States, 1917 — 44–47
Credit, expansion of — 25–26
  relation to prices and gold supply of — 23
Cripple Creek, labor conditions in — 58

D.

Débris Commission, hardships caused by — 73

Page.

Debts of belligerent nations 26
Denmark, National Bank of, assets of 29
liabilities of 29
Dredging, for gold, decline of 66
increased costs of 55, 56

E.

Employees, by States, in 1916 and 1917, number of 59
in principal mining States, number of 46
gold mines, exemption from draft for 71
England, Bank of, assets of 28
liabilities of 28
securities of 25
Exports, gold, by countries 35
United States, 1900–1918 33
merchandise, United States, 1900–1917, value of 31, 33
silver, by countries 35

F.

Federal Reserve Banks, assets of 28
liabilities of 28
Finance, international, of the United States 32
France, Bank of, assets of 28
liabilities of 28
securities of 26
gold reserve of 27
national debt of 26
national wealth of 26
Freight, preferred classification for gold mine supples 73

G.

Germany, gold reserve of 27
national debt of 26
national wealth of 26
Gold, as universal unit of labor 15
exports of, by countries 35
hoarded, definition of 34
imports by countries 35
production 1916, 1917, by States 39–40
purchasing power of, decrease of 18, 69
sale as a commodity of 73–74
world output, 1493–1917 18
diagram of 13, 33
Gold mining, legislative discrimination against 18
Gold Road property, unmined ore in 40
Gold supply, relation to prices and credit of 23
Government supervision, need for 74
Great Britain, gold reserve of 27
See also England, Bank of, assets of.

Page.

Great Britain, national debt of 26
national wealth of 26

H.

Harding, W. P. G., on adequate reserve 30–31
Higgins, Edward, on wage scales 61–62

I.

Idaho, gold production in 41
Imports, by countries, 1917–18 35
gold, United States, 1900–1918 33
merchandise, United States, 1900–1917, value of 31, 33
silver, by countries, 1917–18 35
Index numbers, variations of 16
Ingalls, W. R., diagram showing fluctuation of prices during war by 17
Iron, London price of, 1800–1917, diagram of 13
United States's output, 1800–1917, diagram of 14
world's output of, diagram of 13
Italy, Bank of, assets of 28
liabilities of 28
gold reserve of 27
national debt of 26
national wealth of 26

J.

Japan, Bank of, assets of 29
liabilities of 29
gold reserve of 27
national debt of 26
national wealth of 26
Juneau mines, Alaska, production of 44

L.

Labor, allotment to mines of 72
decrease in efficiency of 58, 59
gold as a universal unit of 15
predominant cost of 56
See also Wages, increase of in factories during the war, diagram of; Cost data, Ready Bullion mine, Alaska, 1912–18.
shortage of, causes of 57
relief of by Chinese labor 63–64
results of 57–58
Legislation injurious to gold mining 18

M.

Mexican labor, importation of 64
Mine products, United States, 1918, amount of 16

Page.

- Miners, United States, 1800–1917, number of, diagram showing, 14
  - 1910, number of, 15
    - percentage of, 15
- Mines, gold, necessity of keeping open, 18
  - reopening of, Government aid for, 76
  - gold producing, United States, 37
- Mining, appropriations, for 1916, 16
  - costs. *See* Cost data.
- Mining, recent development of, 12, 15
- Money, circulation of, United States, 1900–1917, 31
  - relation to foreign trade of, 31
  - in United States, general stock of, 66
  - *See also* United States, national wealth of.
  - in United States Treasury as assets, 66
- Montana, gold production in, 41

N.

- National City Bank on adequate reserve, 30
- Netherlands, Bank of, assets of, 28
  - liabilities of, 28
- Nevada, gold production in, 41
- Norges Bank, assets of, 29
  - liabilities of, 29
- North Star mines, operating costs of, 47

O.

- Open market sale of gold, discussion of, 73–74
- Operating costs, curtailment of, 50
  - *See also* Costs of production, distribution of; increase of, causes of.
- Ore in principal mining States, amount treated, 46–47
  - recovery from, 46–47
- Oregon, gold production in, 42

P.

- Petroleum, United States, price of, diagram showing, 14
  - output of, 1800–1917, diagram of, showing, 14
  - world's output of, diagram showing, 13
- Phillips, Lionel, on need of relief in the Rand, 71
- Population increase, United States, 1800–1917, diagram showing, 14

Page.

- Power, electric, preferred classification of gold mines for, 73
- Prices, during the war, fluctuations of, diagram showing, 17
  - relation to credit and gold supply of, 23
- Production and consumption of gold, United States, diagram showing, 34
- Production of gold, by countries to 1917, 20–21
  - chief producing mines, 37
  - cost of per ounce at mines, 47
  - decline of, 20, 39
    - causes of, 39
  - importance of, 24
  - United States, 20, 23, 34
    - by States, 38, 39–40
    - 1800–1917, diagram of, 14
    - 1900–1918, 33
  - world, 1900–1918, 33
  - *See also* Gold, world's output, diagram of.
- Publications on metal mining, 77–79

R.

- Railway mileage, United States, 1800–1917, diagram of, 14
- Rand, increase of wages in the, 63
- Ready Bullion mine, Alaska, cost data of, 52–53
- Reichsbank, assets of, 28
  - liabilities of, 28
  - securities of, 26
- Reserve gold, in United States, amount of, 19, 25, 27, 33, 34
  - in world, amount of, 19
  - methods of increasing, 65
  - necessity of, 30
  - of principal countries, 27
- Rhodesia, gold production of, 22
- Riksbank, assets of, 29
  - liabilities of, 29
- Rovensky, J. D., on foreign relations, 31–33
- Russia, gold production of, 22
  - gold reserve of, 27
  - national debt of, 26
  - national wealth of, 26

S.

- Securities, in banks of leading countries, 25–26
- Silver, exports by countries, 35
  - imports by countries of, 35
- South Dakota, gold production in, 43
- Spain, Bank of, assets of, 29
  - liabilities of, 29
- Standard of value, advantages of gold as, 23–24
  - danger of changing, 23

Page.

Supplies, central purchasing agency for — 72, 74
  for dredging, increased cost of — 55
    increased cost, at Tonopah mine — 54
    in California — 54–55
Swiss National Bank, assets of — 29
    liabilities of — 29

T.

Taxes, on gold mines, abolishment of 72, 76
Tonopah mine, increased cost of supplies at — 54
Trade balances since July 1, 1914 — 33
Trade, foreign, relation to circulation of money of — 31
Treadwell mines, Alaska, production of — 44
Turkey, gold reserve of — 27

U.

United Eastern mine, production of — 40
United States Employment Service, relief to gold mines through — 71
United States, international finance of — 32
  national debt of — 26
  national wealth of — 26, 34
  See also Money, circulation of; Money in the United States, general stock of; Federal Reserve Banks, assets of; Production of gold, United States.
  production of gold in — 20, 23, 33, 34, 38–40
Utah, gold production in — 42
    diagram of — 14

W.

Wages, for 1913–1915, by States — 61–62
  increase of, in factories, diagram showing — 17
    in the Rand — 63
Waller, E. A., on increased costs in South Africa — 57
  on need of relief in the Transvaal 71
Washington, gold production in — 42
Wealth of chief belligerents — 26
Witwatersrand fields, dividends in, 1887–1917 — 22
  production in, 1887–1917 — 22
  working costs in, 1887–1917 — 22, 48

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